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For Non-Native Speakers of English

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引言：如何使用本书

“凡事都应当尽可能地简单,而不是较为简单。”

——阿尔伯特·爱因斯坦

这本书是为谁准备的?

这本书专为非英语母语者设计，帮助他们用英语撰写科学研究论文并发表。然而，它也可以作为英语母语者的写作指南，尤其是那些希望改进科研写作的人，以及需要撰写硕士论文或博士论文的理科学生。这是一本实用性而非理论性的书，旨在成为研究人员和科学家的快速自学手册。

本书的目标读者是英语水平在中级及以上的人。如果您参加过雅思考试，成绩应在6.0分以上；如果您参加过托福考试，分数应在550分（纸笔考试）或91分（iBT）以上。然而，如果您已经读到这里且未使用字典，这表明您已经可以使用本书，即使您不理解每一个单词。

为什么我需要这本书?

科学研究的目标是发表，但优秀的科学家并不总是优秀的写作者，甚至英语母语者在撰写研究论文时有时也会遇到困难。本书的目标是快速、轻松地为您提供所需的信息、词汇和技能，使您能够自信地使用您阅读期刊时看到的风格和结构来撰写论文。

作为一名科研人员，你能够阅读并理解所在领域复杂、高深的资料。然而，你可能会发现，要写出与阅读水平相当的书面英语并非易事。你或许觉得自己的英语写作无法有效、精准地呈现研究工作的内容。本书的目的在于让你利用阅读能力以及所读的资料，培养工作所需的写作技能。

培养撰写自身研究内容的技能，是融入国际科学界的唯一途径。要是依赖以英语为母语的人士来翻译你的文稿，他们的译文可能无法精准传达你的本意。倘若依靠校对人员来纠正英语错误，有些差错他们可能留意不到，因为一个语法正确的句子，若意思并非你所想表达的，那它仍然是“错的”。而且，校对人员可能不会检查你的写作是否符合常规的“科研”范式。例如，你可能忘了说明选择某种方法的理由，或是没解释研究结果与原始问题之间的关联，而这可能导致科学期刊的编辑以不专业为由拒稿。

撰写并发表研究论文是开启职业生涯的最佳方式。要是你能把自己的论文或研究项目转化成一篇有价值的论文，你的简历（个人履历）立刻会显得更专业，在国际上也更具竞争力。你可能觉得没时间提升英语水平，但多年的阅读经历其实已经让你掌握了大部分所需知识。为了把研究成果撰写成文以便发表，你无需学习太多额外的英语知识。**科研写作远比看上去容易**。

大多数科研成果都按照相当常规的结构撰写：先是标题，接着是摘要，随后是引言，再往后是核心部分，描述做了什么、有什么发现，然后是讨论和 / 或结论。在论文或研究文章末尾，会附上致谢和参考文献。这意味着，所有作者撰写的研究文章结构都颇为相似。

由于科研写作非常模式化，你需要学习的语法和词汇量其实相当少。例如，科研写作中使用的非专业词汇由一组有限

的词构成，诸如 “attempt（尝试）”“conduct（实施；进行）”“interpret（解读；阐释）”“evaluate（评估）”“determine（确定）”“implement（执行；实施）”“formulate（制定；规划）”“classify（分类）”“correlate（关联；使相互关联）”“enhance（增强；提高）”，它们就像是一种 “代码”。开始写作所需的所有词汇（除了你所在领域的专业词汇）都在这本书里。

这本书会教我什么？

这本书将向你展示如何发现你所在领域科研写作在结构、组织、语法和词汇方面的惯例，并为你提供以相似方式、同等水平进行写作的工具。它会教你如何把自己的研究成果转化成一篇可投稿至专业期刊的论文。如果你正在用英语撰写学位论文，你也能够运用这本书中的大部分信息，以及所有的语言和词汇知识。

我给理科生教授学术用途英语已经超过 30 年了。在过去的 15 年里，我一直在伦敦帝国理工学院的英语语言支持项目中教授科研写作，在那儿我还与正在撰写论文或学位论文的个别研究生和教职工密切合作。这本书基于我学到的最有用的一点：当你的语言技能并非完美无缺时，以常规方式组织信息、使用常规语言就非常重要。如果你按照常规模式写作，读者就知道你试图表达什么，因为你遵循的模式是他们熟悉的，因此语言错误的影响就没那么大了。从简单常规的写作模式起步的科研人员，很快就能培养出更高水平的独立、专业写作技能。反之亦然：一开始不按常规模式写作的科研人员，就不太可能培养出这些技能。

这本书是如何起作用的？

本书的策略可总结如下：仔细研读你想要创作的那类优

秀写作范例，识别并掌握这些范例中的结构、语法和词汇，然后将它们应用到你自己的写作当中。

这本书分为五个单元，每个单元对应研究文章的一个部分。第一单元讲引言，第二单元讲方法论，第三单元讲结果，第四单元讲讨论或结论，第五单元讲摘要与标题。鉴于本书旨在让你学会用常规方式写作，每个单元都旨在帮助你了解研究文章相应部分的常规模式是什么样的。在每个单元里，你还会获得撰写该部分研究文章所需的语法及写作技巧方面的辅助，并得到合适的词汇指引。

每个单元都很相似。例如，关于引言的单元，一开始会展示一篇与科学期刊上类似的研究文章引言示例，接着是“语法与写作技巧”部分，旨在解答常见问题。由于你很可能正忙于研究，没太多时间做大量语法练习，所以“语法与写作技巧”部分的语法练习很少。不管怎样，在语法练习中答对题目，并不意味着你在撰写复杂主题时就能自动写出正确的语法。答对题目可能会给你一种虚假的自信与安全感。

在“语法与写作技巧”部分之后，你要利用示例引言创建一个撰写引言的模板，随后是一份详细的答案解析，提供模板描述、讨论内容以及问题答案。该单元还包含真实引言的节选内容，这样你就能测试这个模板，看看它在“现实世界”中是如何发挥作用的。之后会利用这些节选内容找出能帮助你成功运用该模板的词汇，紧接着是一份完整的实用词汇表，以及单词和短语用法示例。

到了这个阶段，你会有一个完备的引言模板、一份应对可能出现的问题的语法指南，以及一份让模板生效的实用词汇表。在单元快结束时，你就可以通过撰写一篇引言来检验所学内容了。如果你完成了各项任务，就应该能够把模板、语法 / 写作技巧以及词汇结合起来，一篇完美的引言几乎能自然而然

地写出来！所以，在引言单元结束时，你要试用所学内容：用模板和词汇表写一篇引言，然后与答案解析中的示例答案作对比。

其余单元也重复这一模式。理想情况下，你应该通读这本书并完成每项任务。如果你只读这本书却不完成任务，你虽然能从理论上明白该怎么做，但实际操作起来可能会更困难。

我还需要其他材料或书籍吗？

不需要，但在开始之前，你应该从常读的期刊中收集三到四篇所在领域近期的研究论文，并把它们复印下来。你要把这些论文当作目标文章，帮助你将在这里学到的知识应用到自己的工作中，而且在阅读本书时要参考它们，看看所学内容在你所在的研究领域是如何呈现的。不要用书里的章节当作目标文章，它们的写作结构与研究论文不同，所以没法帮你了解所在领域的研究论文或学位论文是怎么写的。

你的目标研究文章应当：

1. 由位于英语国家机构的研究人员 / 研究团队撰写，最好作者是以英语为母语的人士
2. 篇幅较为短小（算上图表，A4 纸篇幅不超过 15 页 ）。
3. 涉及的主题尽可能与你自己的课题以及正在开展的研究相近。
4. 有定义清晰的引言、方法论、结果以及讨论 / 结论部分。如果这些部分有小标题会对你更有帮助，这样你就能轻松定位。要注意，不同领域，甚至同一领域的不同期刊，小标题可能会有所不同；例如，“方法论” 部分可能被称作 “流程”“材料与方法” “实验 ” 或其他类似表述。

单元 1 如何写引言

1.1 结构

直到现在，你的科研写作大多集中在撰写报告上，在报告中你只是描述了你所做的和你所发现的。虽然这将帮助你撰写研究论文或论文的核心“报告”部分（方法论和结果），但它并没有为你撰写完整研究文章的引言做好准备；这是一个新的任务，一旦你开始进行研究写作，你就会面临这个任务。

在实践中，您会发现您需要对自己所做的和所发现的事情有明确的了解，以便撰写引言，因此撰写引言的最佳时机是在您撰写或至少草拟报告部分之后。然而，在本书中，研究文章的结构是按照其在论文/学位论文中出现的顺序呈现的，以便您能够追踪各部分之间的联系，并看到信息呈现给读者的顺序。

您可能想通过描述您试图解决的问题或您工作的目标来开始您 的引言，但正如您在检查已发表的工作时会看到的，这并不是大多 数研究论文的开头方式——因此，这并不是您开始的最佳方式。为 了帮助您撰写自己研究的引言，您构建的模型必须回答以下三个问题：

- 作者通常如何开始引言部分？
- 在我的引言中应该包含什么类型的信息，以及顺序是什么？
- 作家通常如何结束引言？

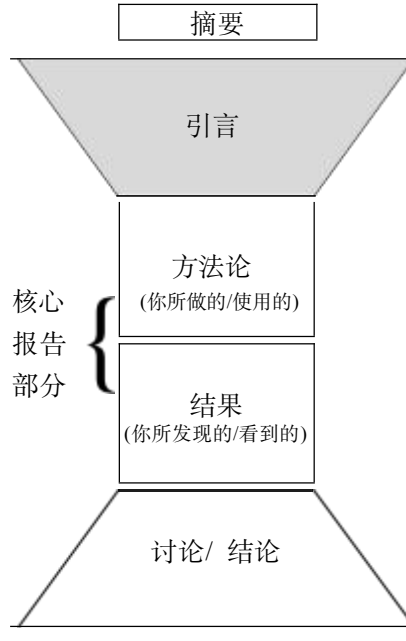


图 1. 研究文章或论文的结构

您可能注意到图1的第一件事是它是对称的。这是因为您在引言中需要做的许多事情都是在讨论/结论中以相反的顺序完成的。例如 ,您需要写一个开场句，以便您和您的读者能够“进入”或开始您的论文/学位论文，并且您还需要在讨论/结论的末尾通过找到一种可接受的方式来“退出”论文/学位论文。此外，核心报告部分进行接口，并且在您从核心部分移出以开始讨论/结论时也是如此——同样是以相反的方式。

您应该注意到图表形状的另一个方面是，它在中央报告部分逐渐变窄，而在之后又逐渐变宽。这代表了引言和讨论/结论中信息的 排列方式：在引言中，您开始时相对一般，逐渐缩小焦点，而在讨论/结论中则恰恰相反。

请阅读下面的介绍。如果您对主题不熟悉，或者在理解单个单词时遇到困难，尤其是像”polylactide”这样的技术术语，请不要担心。在这

个阶段，只需尝试获得一个大致的理解，并熟悉所使用的语言类型。

The synthesis of flexible polymer blends from polylactide and rubber

Introduction

1 *Polylactide (PLA) has received much attention in recent years due to its biodegradable properties, which offer important economic benefits.* **2** *PLA is a polymer obtained from corn and is produced by the polymerisation of lactide.* **3** *It has many possible uses in the biomedical field*[1] *and has also been investigated as a potential engineering material.*[2,3] **4** *However, it has been found to be too weak under impact to be used commercially.*[4]

5 *One way to toughen polymers is to incorporate a layer of rubber particles*[5] *and there has been extensive research regarding the rubber modification of PLA.* **6** *For example, Penney et al. showed that PLA composites could be prepared using blending techniques*[6] *and more recently, Hillier established the toughness of such* composites.[7] **7** *However, although the effect of the rubber particles on the mechanical properties of copolymer systems was demonstrated over two years ago,*[8] *little attention has been paid to the selection of an appropriate rubber component.*

8 *The present paper presents a set of criteria for selecting such a component.* **9** *On the basis of these criteria it then describes the preparation of a set of polymer blends using PLA and a hydrocarbon rubber (PI).* **10** *This combination of two mechanistically distinct polymerisationsformed a novel copolymer in which the incorporation of PI significantly increased flexibility.*

1.2 语法和写作技能

本部分涉及引言中较为重要的四个语言领域：

- 时态搭配
- 信号词语言
- 被动 / 主动语态的使用
- 段落划分

1.2.1 时态搭配

<u>现在简单时/现在进行时</u>

为了在引言中正确使用时态，您首先需要了解现在简单时态和现在进行时态使用方式之间的区别。

看看这两个句子：

(a) I live in Beijing.	Present Simple
(b) I'm living in Beijing.	Present Continuous

（a）描述的是一种永久性的情况，而（b）描述的是一种临时性的情况。正因如此，在科研写作中，一般现在时用于陈述公认的事实与真理 —— 但令人惊讶的是，什么算得上是公认的事实或真理，往往由你自己来决定。有时作者认为研究结果具有事实的地位；在这种情况下，他 / 她可以决定用一般现在时来陈述这些结果，通常随后附上恰当的研究参考文献。以下是来自 1.1 节引言中的一个例子：

> **5** *One way to toughen polymers <u>is</u> to incorporate a layer of rubber particles[5] and there has been extensive research regarding the rubber modification of PLA.*

稍后，在结果部分，您甚至可以选择以这种方式陈述自己的发现。看看这两句话，它们描述了结果：

(*a*) *We found that the pressure* ***increased*** *as the temperature* ***rose****, which* ***indicated*** *that temperature* ***played*** *a significant role in the process.*
(*b*) *We found that the pressure* ***increases*** *as the temperature* ***rises****, which* ***indicates*** *that temperature* ***plays*** *a significant role in the process.*

哪个句子“更强”？在(a)中，使用过去简单时态意味着你的发现仅与自己的研究相关，你并不声称你的推论应该被视为被接受或确立的事实，甚至不认为其他研究者必然会得到相同的结果。在(b) 中，使用现在简单时态意味着你相信你的发现和推论足够强大，可以被视为事实或真理。现在简单时态传达了这种可靠性，你的读者 会相应地对你的工作做出反应。关于这一点将在后面的结果单元中进一步讨论。

一般过去时/现在完成时

在引言中，您需要的另一个时态对是一般过去时和现在完成时。您将需要这两者，并且需要知道何时以及为何从一个切换到另一个。看看这些句子：

(a) Past Simple: I lived in Tokyo for five years…	but I don’t live there anymore.
(b) Present Perfect: I have lived in Tokyo for five years…	and I still live there NOW.
(c) Past Simple: I broke my glasses…	but it doesn’t matter/I repaired them.
(d) Present Perfect: I have broken my glasses…	and so I can’t see properly NOW.

你可能几年前就学会了(a)和(b)之间的区别：一般过去时态和现在完成时态之间的一个区别是动词的“时间”，即它发生的时间。 (c)和(d)之间的区别更难理解，对你作为科学研究的作者来说更为重要。

在 (c) 和 (d) 中，“时间”，即动词发生的时刻，并不是区分这 两个句子的真正因素；(c) 和 (d) 都可能发生在上个月、今天早上或 一纳秒前。重要的是，(d) 中的事件被认为与现在的情况比 (c) 中的 事件更相关，这就是为什么它使用现在完成时。这个相关性的概念 在你写引言时为什么有用？看看第 1.1 节引言中的这些句子：

> *For example, Penney et al.* ***showed*** *that PLA composites could be prepared using blending techniques*[6] *and more recently, Hillier* ***established*** *the toughness of such composites.*[7] *However, although the effect of the rubber particles on the mechanical properties of copolymer systems* ***was demonstrated*** *over two years ago,*[8] *little* attention* ***has been paid*** *to the selection of an appropriate rubber component.*

* 注意：a little 意味着“少量”，而 little 意味着“几乎没有”。

时态变化在哪里？你认为作者为什么从一般过去时态转变为现在完成时态？这是否可能是因为这篇研究文章现在正在关注选择合适的橡胶成分？

现在看看如果作者忘记改变时态并继续使用过去简单时会发生什么：

> *However, although the effect of the rubber particles on the mechanical properties of copolymer systems* ***was demonstrated*** *over two years ago,*[8] *little attention* ***was paid*** *to the selection of an appropriate rubber component.*

突然，这句话的意思是当时（即两年前）几乎没有人关注这个问题。或许从那时起，这个问题得到了关注；甚至可能这个问题已经得到了解决！时态的变化总是具有意义，并且总是表示信息功能的变化——因此，不要随意改变时态，并确保在需要时记得更改时态。

现在通过仔细观察你所选文章的引言中一般过去时和现在完成时的使用情况来检查你对时态的学习。特别注意一般过去时和现在完成时在提及以往研究时的用法。

1.2.2 信号语言

句子连接

写作中最常见的错误之一是未能将一个句子或想法与下一个连接起来。每当你结束一个句子时，读者对下一个句子将要做什么或说什么毫无头绪。因此，句号和下一个大写字母之间的空白对你和你的读者来说都是一个危险的空间。也许你在一个句子后停顿了十分钟 ,在这段时间里你思考了你的工作，想法得到了发展。也许你关掉了电脑，回了家。当你再次开始打字时，如果你不与读者分享这些句子之间的联系，你就会在文本中造成一个空白，这将导致问题。

作为作者，您的任务之一是确保这个差距被填补，以便您的读者能够从一条信息顺利过渡到下一条。连接句子和概念对您也是有益的，因为这迫使您逻辑地发展您的想法。

连接句子的一种方法是重叠，这意味着重复前一句中的某些内容：

The pattern of inflammation during an asthma attack is different from that seen in stable asthma. In ***stable asthma*** *the total number of inflammatory cells does not increase.*

One way to toughen polymers is to incorporate a layer of rubber particles. As a result, there has been extensive research regarding the ***rubber*** *modification of PLA.*

———

另一种方法是使用代词（它，他们）或代名词（这种方法，这些系统）将句子连接在一起：

Many researchers have suggested ways of reducing cost without affecting the quality of the image. ***These methods*** *rely on data structures built during a preprocessing step.*

On the basis of these criteria it then describes the preparation of a set of polymer blends using PLA and a hydrocarbon rubber (PI). ***This combination*** *of two mechanistically distinct polymerisations formed a novel copolymer in which the incorporation of PI significantly increased flexibility.*

第三种方法是根本不完成句子，而是用分号或关系从句（一个“which”从句）将其连接到下一个句子。当两个句子非常紧密相关且其中一个句子相当简短时，用分号连接句子效果很好：

*The procedure for testing whether components are operationally safe usually takes many hours****;*** *this means that tests are rarely repeated.*

It has received much attention over the past few decades due to its biodegradable properties, ***which*** *offer important economic benefits.*

第四种方法是使用信号句连接词来指示一个句子与下一个句子之间，或者一个句子的某一部分与下一部分之间的关系。你从阅读中知道句

子连接词是多么有用；当你看到像*“therefore”*或*“however”*这样的词时，即使你不理解每一个单词，你也能够正确处理句子中的下一条信息。这是因为句子连接词指示了句子中信息的功能。相反的情况也是如此：当作者没有用连接词来指示信息的功能时，读者处理信息就会更加困难。即使语法完美，每个单词都正确，读者仍然可能不确定信息的作用（这是前一句的结果吗？一个例子？一个原因？），并可能以不同于作者所意图的方式进行解读。

原因

The experiment was unsuccessful _____ the measuring instruments were inaccurate.
The experiment was unsuccessful _____ the inaccuracy of the measuring instruments.

due to (the fact that) on account of (the fact that) in view of (the fact that)	as because since

- 使用“since”时要小心；它也常常用来表示“从那时起”，所以 如果有任何混淆的可能性，请选择不同的连接词。
- 所有这些连接词都可以用在句子的开头，甚至是因为（因为测量 仪器不准确，实验没有成功）。

结果

The measuring instruments were calibrated accurately, _____ the experiment was successful.

therefore consequently hence	as a result (of which) which is why so

- 不要用“所以”开头来表达结果；这太非正式了。

• 您有时可以使用 then，例如在“如果 x 则 y”这样的句子中，但它并不适用于每个句子，这就是为什么它没有被包含在此列表中 的原因。

对比/差异

British students are all vegetarians, _____ Norwegian students eat meat every day.

however whereas but	on the other hand while by contrast

• *on the contrary*和*conversely*则不属于这一类别，因为它们不仅仅传达差异；它们传达的是“恰恰相反的事实”，因此你不能在上面的句子中使用它们（因为*vegetarians*和*meat eaters*并不是对立的，他们只是不同）。然而，你可以在以下句子中使用它们：*Some experiments used uncalibrated instruments and succeeded;* ***conversely****, other experiments used carefully calibrated instruments andfailed.*

• 使用“*while*”时要小心；它也常常用来表示“在那时/同时”，因 此如果有任何混淆的可能性，请选择不同的连接词。

意外性

(*a*) _____ *it was difficult, a solution was eventuallyfound.*
(*b*) _____ *the difficulty, a solution was eventuallyfound.*
(*c*) *It was difficult;* _____ *a solution was eventuallyfound.*

(a) Although (a) Even though (a) Though	(b) Despite (b) In spite of (b) Regardless of (b) Notwithstanding	(c) nevertheless (c) however (c) yet (c) nonetheless (c) even so

• 还有其他具有相同含义的连接词，例如 *still* 和 *anyway*，但它们更为非正式。

加法

We used a batch processing system because it was more effective; it was faster.

in addition moreover furthermore apart from that/which	also secondly (etc.) in the second place (etc.) what is more

• 此外，*besides* 的含义或多或少与上面列表中的项目相同，但它更强大，因此在更具说服力的语境中使用更好。

现在通过查看目标文章引言中句子的连接方式来检查您所学到 的内容。

1.2.3 被动/主动

学生们常常问他们是否可以在研究文章中使用“**we**”。在引言中 ，您通常会说明您将在研究文章中做什么或展示什么。您可以使用 “我们”来指代您的研究小组或团队，但不要用它来指代人或人类 一般。如果您是指一般人，最好使用以“它”开头的结构（例如：*It is known/ thought that…*）而不是“*We know/think that…*”。在中心“报告”部 分，使用被动语态而不是“我们”也是很常见的（*was measured, was added, etc.*）。

在论文中，您是以个人身份写作，并且没有研究小组或团队。由于您无法使用“I”来撰写论文，您可能会使用被动语态。使用像 “*here*”和“*in this study*”这样的词。

让你的读者知道你在提及自己的工作时。你也可以使用一个“虚拟”主语来代替我或我们：

> ***This article*** *describes an algorithm for clustering sequences into index classes.*
>
> ***The present paper*** *presents a set of criteria for selecting such a component.*

在正式写作中使用被动语态的问题在于，施动者（执行动词动作的人）通常在句子中没有提及。换句话说，我们说某事*was done*或*was identified*，但我们不说“由我”或“由其他研究人员”，因此读者可能不知道是谁*did*的或是谁*identified*的。这可能会导致混淆，因此有时在引言中使用虚拟主语（*This article/ the present paper*）比使用“无施动者”的被动 语态（*x is presented*）更清晰。现在看看你的目标文章的引言中被动语态和虚拟主语的使用方式。

段落划分

为什么段落划分很重要?

段落是有效阅读和写作的重要视觉辅助。段落中常见的两个错误是短小或单句段落的聚集，以及段落过长。这两种错误都会使读者感到困惑，并且是组织不良写作的标志。

要理解段落如何运作，想象一下你赢得了一次24小时的巴黎之旅。你有两个选择。第一个选择是飞往巴黎，下飞机后在城市里四 处走走。如果你选择了这个选项，朋友可能会问你是否看到了著名 的卢浮宫艺术画廊；你会说：“Well, no, I got lost and spent hours walking around the industrial area by mistake.”你向母亲展示你在巴黎买的衣服，她问你 是否是在著名的和平街购物街买的，你说：“No, I bought them near my hotel. I didn’t know where the big shopping area was.”你开始意识到自己浪费了很多时间，错过了许多重要的事情。

第二个选择是在离开机场之前，乘坐短暂的直升机游览巴黎。 这是一个困难的决定，因为你很不耐烦；你只有24小时，不想浪费时间，但你还是选择了这样做。直升机在巴黎上空飞行半小时，呈网格状，之后你开始你的巴黎之旅。你找到了一家位置优越的酒店 ,这是你从直升机上看到的。你在和平街（Rue dela Paix）购买衣物——这是你从直升机上看到的。你参观了卢浮宫，并在市中心附近的一个大公园里吃午餐……这是你从直升机上看到的。

这与良好的段落结构有什么关系？

让我们把这个想法带入阅读和写作的技能中。如果你在完成一本谋杀悬疑小说之前先读了最后一页，故事的其余部分就会少一些刺激感——但你可能会更快地读完这本书。这是因为你不再浪费时间去猜测凶手是谁；你知道是丈夫，所以每当提到他的名字时，你就会集中注意力仔细阅读，但你不会去关注其他嫌疑人的细节。这使你能够更快地阅读，因为你有信心忽略那些你知道不相关的事情。

你对所阅读内容了解得越多，阅读的速度和效率就越高。那么，在阅读之前，如何了解一篇长文章或章节呢？答案是在开始阅读 之前快速浏览一下。就像在巴黎的直升机游览，浏览是在阅读之前进行的，而不是替代阅读。你在浏览文本时的目标是快速了解其内容以及各种信息的位置，以便你能够更快、更自信地阅读。

我如何高效快速地浏览？

下一页框中的大多数说明只是告诉你“查看”或“检查”某些内容 。略读是一种预读技巧，应该非常快速地进行；如果花费超过几分钟，你就不是在略读，而是在阅读。

略读可能有助于我阅读，但它如何帮助我写作呢？

查看框中的第6条：LOOK QUICKLY AT THE FIRST SENTENCE OF EACH PARAGRAPH.学术写作中的段 落通常以*topic sentence*，主题句给出段落的主要思想，并告诉读者段 落的内容。其他句子与此相关。

1. READ THE TITLE
   and try to predict the type of information you expect to see
2. LOOK AT THE NAME OF THE AUTHOR
   What you know about the writer will help you predict and evaluate the content.
3. CHECK THE DATE
   and use it to help you assess the content.
4. READ THE ABSTRACT
   to find out what the researchers did and/or what they found
5. LOOK QUICKLY AT THE FIRST PARAGRAPH
   without trying to understand all the words.
6. LOOK QUICKLY AT THE FIRST SENTENCE OF EACH PARAGRAPH
   without trying to understand all the words
7. LOOK QUICKLY AT EACH FIGURE/TABLE AND READ ITS TITLE
   to try and find out what type of visual data is included
8. READ THE LAST PARAGRAPH
   especially if it has a subtitle like ‘Summary’ or ‘Conclusion’

这个想法；他们讨论它，描述它，更详细地定义它，争论它，举例说明它，重新表述它，等等。当“主题”或想法与第一句相距太远时，作者通常会开始一个新段落。

因此，您可以通过阅读每个段落的第一句话，获得文章或书籍章节中涵盖的各种主题的良好概念。由于这是写段落的常规方式， 因此这也是您写段落的安全方式。您越了解其他作者如何构建段落 ,您自己做到这一点就会越容易。

如你所知，段落要么通过缩进（开始时五个空格）来标记，要么通过行间的双空格来标记。多年来，你对这些视觉信号已经形成了非常强烈的反应。这意味着每当你开始一个新段落时，你大脑中的这种条件反应会为某种变化或转变做好准备。

正确的段落划分至关重要，但很容易养成不良的段落习惯，无论是出于懒惰还是粗心。如果你经常写一段话只有一句话，或者你的段落似乎很长，或者你不确定何时开始一个新段落，那么你正在让写作变得更加困难。当你在规划你的论文时，写下你想要讨论的每个想法/概念，检查它们是否按逻辑顺序排列，然后列出你想要说 的每个内容，使用项目符号。这将帮助你创建具有逻辑和连贯结构的段落。

1.3 写作任务：构建模型

1.3.1 构建模型

您现在准备开始构建引言模型，通过在提供的空间中写下作者在每个句子中所做的简短描述。这可能会很困难，因为这是您第一次这样做，因此在开始之前请阅读下面的指南。关键在下一页。一旦您尝试制作自己的模型，您可以使用关键来帮助您在最终独立撰写研究文章的这一部分时。

指南：您应该在此任务上花费30-45分钟。如果您无法想到第一句的好描述，请选择一个更简单的，例如第7句，并从那里开始。请记住，您的模型只有在可以转移到其他引言时才有用，因此不要包 含内容词，例如*polymer* ，否则您将无法使用您的模型在您自己的领域生成引言。

找出作者在句子中所做的事情——而不是他/她所说的内容——的一种方法是想象你的电脑不小心删除了它。当它消失时，作为读 者的你有什么不同？如果你在电脑上按下另一个键，句子又出现了 ,这如何影响你对信息的反应？

另一种了解作者在句子中所做的事情的方法是查看语法和词汇 线索。主要动词的时态是什么？这个时态通常用于什么？它与前一 句的时态相同吗？如果不同，作者为什么改变了时态？作者选择使 用了哪些词？

不要期望能产生一个完美的模型。当你查看关键时，你会修改 你的模型，也许在你将其与目标文章中的引言工作方式进行比较时 还会再次修改。

The synthesis of flexible polymer blends from polylactide and rubber

Introduction

In this sentence, the writer:

1 Polylactide (PLA) has received much attention in recent years due to its biodegradable properties, which offer important economic benefits. **2** PLA is a polymer obtained from corn and is produced by the polymerisation of lactide. **3** It has many possible uses in the biomedical field[1] and has also been investigated as a potential engineering material.[2,3] **4** However, it has been found to be too weak under impact to be used commercially.[4]

1_____

2_____

3_____

4_____

5 One way to toughen polymers is to incorporate a layer of rubber particles[5] and there has been extensive research regarding the rubber modification of PLA. **6** For example, Penney *et al.* showed that PLA composites could be prepared using blending techniques[6] and more recently, Hillier established the toughness of such composites.[7] **7** However, although the effect of the rubber particles on the mechanical properties of copolymer systems was demonstrated over two years ago,[8] little attention has been paid to the selection of an appropriate rubber component.

5_____

6_____

7_____

8 The present paper presents a set of criteria for selecting such a component.

8_____

9 On the basis of these criteria it then describes the preparation of a set of polymer blends using PLA and a hydro-carbon rubber(PI). **10** This combination of two mechanistically distinct polymerisations formed a novel copolymer in which the incorporation of PI significantly increased flexibility.

9_____

10_____

1.3.2 关键

In Sentence 1 '*Polylactide (PLA) has received much attention in recent years due to its biodegradable properties, which offer important economic benefits.*' **the writer establishes the importance of this research topic.**

如果你在句子1中写了"引入主题"，那么在撰写真正的研究文 章时，这并不会真正帮助你。你到底如何"引入"一个主题呢？你 需要更具体一些。

大多数研究文章开始时会指出研究领域或主题是有用的或重要 的。它们可能会关注该领域的研究数量，或者该领域的研究有多有 用，或者仅仅是这个研究领域有多重要。如果你查看你的目标文章 ,你可能会在前一两句话中找到确立研究重要性的内容。像"*much study in recent years* "或""*plays a major role*""这样的短语在这里很常见， 你会在第1.4节找到一份有用词汇的列表。

如果我没有信心说我的研究是重要的，那该怎么办?

大多数研究文章的作者首先会阐明他们研究的重要性；如果你不这样做，可能会显得你的研究并不重要，因此不要害羞地说明你的领域为何或如何重要或有用。

我应该用什么时态来写这里的内容?

像"*much study in recent years*"或"*in the past five years*"这样的短语通常会跟随现在 完成时（"*Much study in recent years has focused on...*"）。其他建立重要性的方法可 能会使用一般现在时（"*There are substantial benefits to be gained from…*"）。

In Sentence 2 '*PLA is a polymer obtained from corn and is produced by the polymerisation of lactide*.' **the writer provides general background information for the reader**.

句子2使用现在简单时态，这种时态用于公认/确立的事实（见第1.1节）。研究文章通常以公认或确立的事实开始。这确保读者与作者拥有相同水平的背景信息，因此准备好阅读文章。

那么我应该从什么样的事实开始呢？

这取决于你的主题有多广泛——因此也影响到你的读者群。如果你的研究主题非常具体，那么许多读者将拥有较高的背景知识，你可以从相对具体的信息开始。如果你的论文可能吸引更广泛的受众，那么你应该从更一般的背景信息开始。请记住，背景事实可能来源于研究（见第1.1节），因此在必要时不要忘记包含相关的研究引用。

如果我想从几个背景事实开始，而不仅仅是一个，我该怎么办？我怎么知道从哪个开始？

从最一般的信息开始，即许多读者可能已经知道的内容。这是一个"meeting place"事实，是所有读者可以共同起步的地方，之后你可以转向更具体的信息。在你深入细节之前，始终向读者展示总体情况：**在你检查砖块之前，先展示墙面！**同时，不要忘记填补这些句子之间的空白（见第1.2.2节），以便让读者能够顺畅地理解信息。

请记住，与你和你的同事而言，研究的背景事实是非常熟悉的，但对所有读者来说未必如此。因此，如果文章要面向更广泛的受众，你需要陈述那些对你来说似乎显而易见或众所周知的背景事实。

我仍然不确定从哪里开始。

如果你仍然在为第一句话而苦恼，可以看看你的标题。如果你能定义标题中的关键词，这对读者是有帮助的——也许你可以从对这些关键词之一的定义或一个事实开始。

我能不能先描述一下我希望解决的问题?

你可以，但大多数作者不这样做，因为有时很难确切地说出问题是什么，直到你的读者拥有足够的背景信息来理解它。限制自己只用一句话描述你希望解决的问题也非常困难，没过多久，你就写下了 很多具体信息，而你的读者还没有准备好，因为你没有给他们足够 的背景。

> **In Sentence 3** '*PLA has many possible uses in the biomedical field*[1] *and has also been investigated as a potential engineering material* [2,3]' **the writer does the same as in Sentences 1 and 2, but in a more specific/detailed way, using research references to support both the background facts and the claim for significance**.

研究参考文献难道不意味着这是文献综述的一部分吗?

不，这仍然是该领域一般研究的背景部分。通常在研究文章的引言中找到的简短文献综述会在后面出现，并且更可能涉及个别研究及其方法或结果。在论文中，文献综述要长得多，可能是一个单独的 章节。

所以作者为什么要引用参考文献，即使这只是背景呢？有三个原因： 首先，因为抄袭（未能给予他人适当的工作信用）是不专业的；其次，引用让读者有机会找到并阅读提到的研究。第三个原因是，未能提供参考文献可能表明您对自己领域的研究不 熟悉。

尽管句子3不是文献综述的一部分（文献综述在引言的后面）， 但它包含了一个引用参考。在撰写研究论文之前，您需要从期刊和 互联网收集大量的参考文献、引用和想法，其中许多将在论文的某 个时刻提到。当您在撰写引言时，您需要问自己三个问题：

1. 我阅读过的哪些研究论文应该在引言中提到？引言中名称和参考 文献的选择很重要，因为它们为读者绘制了一张研究“地图”，指 明了您所在领域的关键参与者以及迄今为止的进展或成就。这些名 称和参考文献使读者清楚地了解您的研究位置以及它与该领域其他 工作的关系。

2. 哪些内容应该作为研究的背景（如上文第3句所述），哪些内容应该放在稍后在引言中出现的文献综述中？如果研究结果是众所周知 的，并且被认为足够可靠，可以作为真理呈现，那么你可以将它们 以事实背景的形式用一般现在时呈现在你的论文中（如第3句所述） ,并附上研究引用。文献综述通常描述你所在领域的最新和当前研 究，通常会提到作者的名字，句子通常使用一般过去时或现在完成 时。

3. 我应该按什么顺序提到它们？谁排在第一，谁排在最后？关于文 献综述本身的这些问题将在第6句之后讨论。

In Sentence 4 ‘*However, it has beenfound to be too weak under impact to be used commercially.*[4]’ **the writer describes the general problem area or the current research focus of the field**.

请注意，作者仍然没有描述这篇研究文章将要解决的具体问题；他/她正在描述该领域当前的关注点，这是许多研究人员感兴趣的问题，并且引出了本文将要讨论的具体问题。请记住，要简明扼要地描述问题领域或当前研究焦点，否则你会发现自己开始具体描述研究所要达到的目标，而在引言的这一阶段仍然为时已早。

正如你从第四句中看到的，当你描述文章将要处理的问题时，可能需要引用研究文献；然而，如果这是一个众所周知的问题（而不是像第四句中提到的那样的近期问题），那么就不必提供引用。

In Sentence 5 ‘*One way to toughen polymers is to incorporate a layer of rubber particles.*[5]’ **the writer provides a transition between the general problem area and the literature review.**

作为一般规则，您应该在有用的地方引用之前或当前的研究，即使在主要用于提供过渡的句子中。确保上标参考编号仅包括句子中提到的所有工作（有关此内容的更多信息，请参见下面的第6句注释）。

In Sentence 6 '*For example, Penney et al. showed that PLA composites could be prepared using blending techniques*[6] *and more recently, Hillier*[7] *established the toughness of such composites.*' **the writer provides a brief overview of key research projects in this area**.

您不能随意将文献综述"倾倒"到页面上；您应该安排您的参考文献和研究，以便读者能够以逻辑的方式处理它们。以下是三种常见 的选项：

- 按时间顺序：按时间顺序处理研究。这可能是合适的，例如，如果您所在领域的发展与政治决策相关。
- 不同的方法/理论/模型：根据它们的方法或方法论对小组项目或研 究进行分类。将相似的项目分组在一起可以帮助您避免"网球比 赛"效应，在这种效应中，您在文献综述中，向前和向后推进，每个句子以"*However* "或"*On the other hand*"开头！
- 一般/具体：从该领域的一般研究开始，逐渐转向与您自己的研究 更接近的研究。

研究引用何时应出现在句子中间？

当有必要避免混淆时，例如当你在一句话中提到多个研究，或者当引用参考仅涉及你句子的一部分时。你可以在句子6和7中看到这些例子。

In Sentence 7 '*However, although the effect of the rubber particles on the mechanical properties of copolymer systems was demonstrated over two years ago,*[8] *little attention has been paid to the selection of an appropriate rubber component.*' **the writer describes a gap in the research**.

这就是你开始介绍论文目的和具体问题的地方，为此有必要创建一个研究空间。你可以通过描述前期研究中的一个问题，或者指 出研究中的一个空白来做到这一点。通常用信号连接词如“*However*” 或“*Although*”来引入它。在专业写作中，将其以问题的形式提出是不寻常的；相反，你可以将其表述为一个你打算测试的预测或假设。

不要害羞地指出之前研究中的问题。首先，这可能是为了说明 你为什么进行你的研究，其次，这里使用的语言通常是尊重和客观 的，因此不被认为是冒犯。我们将在单元末的词汇部分查看这种语 言的礼貌性。

在这个阶段，您可能需要更多的背景信息（例如，您可能需要 提供您选择研究的材料的性质细节，或描述您计划改进的设备的具 体部分）。研究写作需要比您之前在本科写作中提供的背景信息多得多，提供稍微过多的背景信息总比提供过少的要好。

In Sentence 8 ‘*The present paper presents a set of criteria for selecting such a component.*’ **the writer describes the paper itself**.

在这个阶段，您可以转向当前的工作。您可以描述它，说明它 的目的或重点，给出它的结构或这些的组合。请查看第1.2.3节，以 确定这些句子是用主动语态还是被动语态书写。

您通常使用一般现在时来描述工作本身（*This paper is organised as follows* or *This study focuses on*）以及使用一般过去时来谈论工作的目标（*The aim of this project was…*），因为在“实时”中，目标发生在工作进行之前。也可以用一般现在时陈述目标（*The aim of this work is…*）。在您提交 的论文中，尤其在目标仅部分实现的情况下，这一点尤其成立，剩 余的工作将在后期完成并报告。

In Sentence 9 ‘*On the basis of these criteria it then describes the preparation of a set of polymer blends using PLA and a hydrocarbon rubber(PI).*’ **the writer gives details about the methodology reported in the paper**.

In Sentence 10 '*This combination of two mechanistically distinct polymerisations formed a novel copolymer in which the incorporation of PI significantly increased flexibility.*' **the writer announces the findings**.

尽管您可以在引言中提供有关您的方法论或发现的信息，但请 注意此时不要过于详细，否则您会发现自己在方法论或结果部分没 有任何可写的内容。

看看作者如何开始第9和第10句。在每种情况下，信息都通过一个代词与前一句连接（*On the basis of* ***these criteria*** in Sentence 9 and ***This combination*** in Sentence 10）。

1.3.3 模型

这里是我们收集的句子描述：

In Sentence 1 **the writer establishes the importance of this research topic.**

In Sentence 2 **the writer provides general background information.**

In Sentence 3 **the writer does the same as in Sentences 1 and 2,but in a more specific/detailed way.**

In Sentence 4 **the writer describes the general problem area or the current research focus of the field.**

In Sentence 5 **the writer provides a transition between the general problem area and the literature review.**

In Sentence 6 **the writer provides a brief overview of key research projects in this area.**

In Sentence 7 **the writer describes a gap in the research.**

In Sentence 8 **the writer describes the paper itself.**

In Sentence 9 **the writer gives details about the methodology reported in the paper.**

In Sentence 10 **the writer announces the findings.**

我们可以简化这些，使我们的模型具有四个基本组件：

1	ESTABLISH THE IMPORTANCE OF YOUR FIELD PROVIDE BACKGROUND FACTS/INFORMATION (possibly from research) DEFINE THE TERMINOLOGY IN THE TITLE/KEY WORDS PRESENT THE PROBLEM AREA/CURRENT RESEARCH FOCUS
2	PREVIOUS AND/OR CURRENT RESEARCH AND CONTRIBUTIONS
3	LOCATE A GAP IN THE RESEARCH DESCRIBE THE PROBLEM YOU WILL ADDRESS PRESENT A PREDICTION TO BE TESTED

1.3.4 测试模型

下一步是观察这个模型在实际引言中的运作方式。以下是一些真实研究文章的完整引言。请仔细阅读，并在你认为看到模型组件（1、2、3或4）的位置进行标记。例如，如果你认为引言的第一句对应于我们模型中的第1项，请在其后写上1，依此类推。

The height of biomolecules measured with the atomic force microscope depends on electrostatic interactions

INTRODUCTION

Because the atomic force microscope (AFM) (Binnig *et al*., 1986) makes it possible to image surfaces in liquids, it has become an important tool for studying biological samples (Drake *et al*., 1989). Recent reports document the observation of protein assemblies under physiological conditions at nanometer resolution (Butt *et al*., 1990; Hoh *et al*., 1991; Karrasch *et al*., 1993, 1994; Yang *et al*., 1993, Schabert and Engel, 1994; Mou *et al*., 1995b; Muller *et al*., 1995b, 1996b). As demonstrated on solids under vacuum conditions (Sugawara *et al*., 1995) and in liquid (Ohnesorge and Binnig, 1993), the AFM also makes it possible to measure sample heights with subangstrom accuracy. However, the heights of native biological samples measured with the AFM in aqueous solution vary significantly, and may differ from values estimated with other methods (Butt*etal*., 1991; Apell*et al*., 1993; Muller *et al*., 1995b, 1996a; Schabert and Rabe, 1996). For example, the height reported for single purple membranes ranges from 5.1 ± 0 nm to 11.0 ± 3.4 nm (see Table 1). Height measurements on actin filaments (Fritz *et al*., 1995b), bacteriophage ø29 connectors (Muller *et al*., 1997c), cholera toxin (Yang *et al*., 1994; Mou *et al*., 1995b), DNA (Hansma *etal*., 1995; Mou *et al*., 1995a; Wyman *et al*., 1995), gap junctions (Hoh *et al*., 1993), GroEL (Mou *et al*., 1996), hexagonally packed intermediate layer (HPI) (Karrasch *et al*., 1993; Muller *et al*., 1996a; Schabert and Rabe, 1996), lipid bilayers (Mou *et al*., 1994, 1995b; Radler *et al*., 1994), and microtubules (Fritz *et al*., 1995a) exhibit a similar variability. Height anomalies

of soft surfaces have previously been studied and attributed to the mechanical properties of the sample (Weisenhorn *et al*., 1992; Radmacher *et al*., 1993, 1995; Hoh and Schoenenberger, 1994). However thin samples such as two-dimensional protein arrays or biological membranes adsorbed to a solid support are not sufficiently compressible to explain such large height variation.

Here we demonstrate that electrostatic interactions between the AFM tip and the sample (Butt, 1991a, b) influence the measured height of a biological structure adsorbed to a solid support in buffer solution. The DLVO (Derjaguin, Landau, Verwey, Overbeek) theory (Israelachvili, 1991) is used to describe the electrostatic repulsion and van der Waals attraction acting between tip and sample (Butt *et al*., 1995). Experimental results and calculations show that the electrostatic double-layer forces can be eliminated by adjusting the electrolyte concentration (Butt, 1992a, b), providing conditions for correct height measurements with the AFM. In addition, the observed height dependence of the biological structure on electrolyte concentration allows its surface charge density to be estimated.

Optimal location discrimination of two multipartite pure states

1. INTRODUCTION

Entanglement lies at the heart of many aspects of quantum information theory and it is therefore desirable to understand its structure as well as possible. One attempt to improve our understanding of entanglement is the study of our ability to perform information theoretic tasks locally on non-local states, such as the local implementation of non-local quantum gates [2], telecloning [3], the remote manipulation and preparation of quantum states [4] or the recently studied question of the local discrimination of non-local states by a variety of authors. In [1] it was shown that any two orthogonal pure states can be perfectly discriminated locally, whereas in [5] examples of two *orthogonal* mixed states were presented which *cannot* be distinguished

perfectly locally. Another surprising development is that there exist bases of product orthogonal pure states which cannot be locally reliably discriminated, despite the fact that each state in the basis contains no entanglement [6]. Here we discuss the issue of discriminating two non-orthogonal pure states locally, and show that in this regime the optimal global procedure can be achieved.

Inert COD production in a membrane anaerobic reactor treating brewery wastewater

INTRODUCTION

The chemical characterization of wastewaters is commonly undertaken to determine their biological treatability, load on an existing treatment system, or compliance with the final discharge standards. In each case, one of the most important parameters to be measured is the chemical oxygen demand (COD). In general, the COD value of a wastewater mainly represents the biodegradable and non-biodegradable organic components, although inorganic compounds may be significant in certain cases. In biological treatment systems, the biodegradable fraction of wastewater can be removed effectively, but its non-biodegradable fraction passes through the system unchanged. In addition to this, a significant amount of soluble microbial products may be produced by microorganisms within the treatment systems. Some of these will be resistant to biological degradation and will appear in reactor effluents. The factors that affect effluent quality and overall organic matter removal in biological treatment systems are, therefore, the presence of both the inert COD fraction in the influent wastewater and the soluble microbial products which are produced during biological treatment. Although their concentrations may have few practical implications in the treatment of low strength wastewaters, they may have relatively greater significance in the treatment of medium-high strength industrial wastewaters.

There is extensive literature on the determination of inert COD fractions in industrial wastewaters under aerobic conditions (Chudoba, 1985; Ekama *etal*., 1986; Rittman *et al*., 1987;

Henze *et al*., 1987; Orhon *et al*., 1989; Germirli *et al*., 1991). However, little has been reported under anaerobic conditions (Germili*etal*., 1998; Ince *etal*., 1998). Since medium-high strength industrial wastewaters have been treated efficiently by anaerobic treatment systems, both the inert COD fraction of wastewaters under anaerobic conditions and the soluble microbial products produced within the anaerobic treatment systems should be investigated.

A novel anaerobic reactor system, crossflow ultrafiltration membrane anaerobic reactor (CUMAR) has previously shown great potential for retaining high biomass levels and high biological activity within a fully functioning anaerobic digester (Ince *et al*., 1993, 1994, 1995a). Since the CUMAR system can be operated at high organic loading rates, the quantification of its efficiency under varying loading rates would be of considerable interest, particularly with regard to the nature and quantity of soluble COD produced in the reactor effluent under various operating conditions.

In this study, formation of soluble microbial products within a 120:1 [is this correct? Should it be 120:1?] pilot-scale CUMAR system treating brewery wastewater will, therefore, be discussed in relation to reactor operating conditions.

Organic vapour phase deposition: a new method for the growth of organic thin films with large optical non-linearities

1. INTRODUCTION

There is considerable interest in organic materials with large second-order hyperpolarizabilities for use in non-linear optical (NLO) devices such as modulators and frequency doublers [1]. To achieve a high figure of merit for such NLP devices requires a material with a non-centrosymmetric bulk structure and low dielectric constant.

To this end, NLP-active chromophores are traditionally incorporated into a polymer matrix and electrically poled to achieve the necessary bulk symmetry. However, such materials

are limited by their low glass transition temperatures and poor stabilities at elevated temperature.

Recently, single crystals of organic and organometallic salts [2-4] have been shown to possess extremely large second-order ($x(2)$) NLP effects leading to a high second harmonic generation (SHG) efficiency. The naturally non-centrosymmetric crystal structures of these compounds obviates the need for external poling. Furthermore, these salts have a high optical damage threshold and sufficient stability with respect to temperature to withstand many conventional semiconductor fabrication processes. In particular, highly pure single crystals of the salt, 4′ -dimethylamino-N-methyl-4-stilbazolium tosylate (DAST) [2], have been shown to have a value of $x(2)$ at least 103 times greater than that of urea due to dipole alignment of the cation and anion constituents of the DAST structure. To illustrate this alignment, the DAST bulk crystal structure is shown in the inset of Fig. 1.

For many applications such as waveguide devices, it is desirable to grow NLO materials into optical quality thin films. Although thermal evaporation in a high vacuum environment has been used to grow thin films of many organic [5-7] and inorganic materials, the technique is not always applicable to highly polar molecules [8] or organic salts.

For example, when heated in vacuum, DAST decomposes before vaporization. Although in situ reactions of multicomponent organic molecules to synthesize polymer films previously has been demonstrated using vacuum techniques as physical vapour deposition or vapour deposition polymerization [9], attempts in our own laboratory at double-source co-evaporation of DAST neutral precursors 4′ -dimethylamino-4-stilbazole (DAS) and methyl p-toluenesulfonate (Methyltosylate, MT) to form DAST have been unsuccessful, due in part to the radically different vapour pressures of DAS and MT, which leads to highly non-stoichiometric growth. In contrast, atmospheric or low pressure (eg milliTorr) vapour phase epitaxy (VPE) has been used to grow epitaxial thin films of many III-V compound semiconductors, such as InP and GaAs, where there is a large difference in the vapour pressures of the group III and group V atomic constituents [10]. This method was recently extended to allow the growth of III-V and II-VI

semiconductors from volatile organic precursors [11]. Here, a high vapour pressure compound (typically a metal halide or a metallorganic) of each respective metal is carried independently, via a carrier gas, to a high temperature reaction zone. In this zone, the compounds are deposited onto a heated substrate where they thermally decompose and react to yield the desired III-V compound. The excess reactants and reaction products are then exhausted from the system via a scrubber.

In this paper we apply the techniques of VPE to grow films of DAST by the reaction of two volatile organic materials in a hot-wall, atmospheric pressure reactor. By nuclear magnetic resonance (NMR) analysis, we find that the stoichiometry of polycrystalline DAST films is >95% pure (limited by instrumental sensitivity). Using X-ray diffraction and other analytical techniques, we observe a significant dependence of film quality, such as ordering and crystallite size, on the substrate composition and other deposition conditions used for growth, suggesting that it may be possible to generate optical quality thin films of DAST and similar organic salts and compounds by OVPD using suitable substrates. To our knowledge, this is the first demonstration of the deposition of ordered thin films of a highly non-linear optically active organic salt using atmospheric vapour phase techniques.

Limitations of charge-transfer models for mixed-conducting oxygen electrodes

INTRODUCTION

Traditionally, electrochemistry is concerned with charge-transfer reactions occurring across a 2-dimensional interface. Indeed, at any macroscopic two-phase boundary, the magnitude, direction and driving force for current density can be described relatively unambiguously. As early as 1933 [1], workers began introducing the concept of a ‘three-phase boundary’ (solid/liquid/gas) in order to allow for direct involvement of gas-phase species at an electrochemical interface. However, since matter cannot pass

through a truly one-dimensional interface among three phases, concepts of 'interfacial area', 'current density', and 'overpotential' at a three-phase boundary lack clear definition. For example, where exactly is the current flowing from/to, and what is the local flux density? Also, if we define overpotential in terms of thermodynamic potentials of species outside the interfacial region, what species and region are we talking about? Although the three-phase boundary concept may serve as a useful abstraction of the overall electrode reaction, it does not address these mechanistic questions.

Workers studying gas-diffusion electrodes in the mid-1960s recognized the limitations of the three-phase boundary concept [2, 3]. As an alternative, they began to break down the electrode reaction into individual steps, some that involve charge-transfer across a two-dimensional interface, and some that involve dissolution and diffusion of molecular species in three dimensions or across a chemical interface. These and subsequent studies have demonstrated that electrodes with *i-V* characteristics indicative of charge-transfer limitations (eg. Tafel behaviour) can, in fact, be limited by steps that do not themselves involve charge-transfer [4]. Although the solid-state literature has held on to the three-phase boundary concept more tightly than the aqueous or polymer literature, few examples remain today or solid-state electrochemical reactions that are not partially limited by solid-state reaction and diffusion processes.

One example is the O_2-reduction reaction on a mixed-conducting perovskite electrode, which defies rational explanation in terms of interfacial impedance. In order to incorporate non-charge-transfer effects, workers often apply an empirical Butler–Volmer model (for DC characteristics) or an equivalent-circuit model (for AC impedance) that treat non-charge-transfer processes in terms of an *effective* overpotential/current relationship [5, 6]. However, this approach lacks generality and can often be incorrect for treating oxygen absorption and solid-state and gaseous diffusion, which contribute to the impedance in a convoluted manner [7]. Although such models may provide a useful set of parameters to 'fit' data accurately, they leave the electrode reaction

mechanism only vaguely or empirically defined, and provide little mechanistic insight.

The purpose of this paper is to provide a framework for defining 'charge-transfer' and 'non-charge-transfer' processes, and to illustrate how they are different. We investigate why charge-transfer models have difficulty modelling non-charge-transfer effects, and walk through several examples including the ALS model for oxygen reduction on a porous mixed-conducting oxygen electrode. We then review a recent study of linear AC polarization of La_{1-x} Sr_x CoO_{3-5} (LSCO) electrodes on ceria that corroborates the ALS model, and demonstrates the importance of O_2 surface exchange and diffusion. This study shows that the electrode reaction extends up to 20 microns beyond the electrode/electrolyte interface, implying that electrode polarization is better described by macroscopic thermodynamic gradients than as an 'overpotential'.

现在对目标文章的引言做同样的事情。你应该会发现大多数引言以 项目1开始，模型组件的顺序通常相当可靠（尽管项目2和3可能出现 多次），几乎所有引言都以数字4结束。因此，我们已经回答了本单元开始时提出的三个问题：

- 我该如何开始引言？我应该以什么类型的句子开头？
- 在我的引言中应该包含什么类型的信息，以及顺序是什么？
- 如何结束引言？

1.4 词汇

您现在需要为引言模型的每个部分收集词汇。本节中的词汇来自600 多篇不同领域的研究文章，这些文章均由母语者撰写并发表在科学 期刊上。只有频繁出现的单词/短语被选入。

包括；这意味着词汇表包含被作者和编辑认为正常和可接受的单词 和短语。我们将查看模型以下领域的词汇：

1. 确定显著性

这包括诸如*Much research in recent years*。一个常用词汇和表达的好列表将鼓励你在你的第一句话中包含这些内容。

2. 先前和/或当前的研究与贡献

这包括所有描述研究人员所做的过去时动词，即*calculated*、*monitored*等。与 其仅使用"*did*"、"*showed*"和"*found*"，你通常需要更具体地说 明研究人员实际上"做了"什么！

3. 差距/问题/疑问/预测

这包括表达以往和/或当前研究尚未完成或未解决您的论文所涉及问题的方式。*e.g. However,few studies havefocused on …*

4. 本工作

这可能包括您的目的、策略和论文的设计，使用类似于"*the aims of the present work are asfollows:*"的语言：

词汇任务

请查看本单元的引言以及您目标文章的引言。划线或突出显示您认为可以用于上述四个领域的所有单词和短语。

有用语言的完整列表可以在接下来的页面找到。这包括本单元引言中所有适当的单词和短语，以及您可能在目标文章中看到的一些其他常见词汇。在每个列表下方，您将找到它们的使用示例。请仔细阅读列表，并在字典中查阅您不认识的词汇的意思。这个列表在未来的很多年中都将对您有用。

1.4.1 引言的词汇

1. 确定显著性

(a) basic issue	economically important
(a) central problem	(has) focused (on)
(a) challenging area	for a number of years
(a) classic feature	for many years
(a) common issue	frequent(ly)
(a) considerable number	generally
(a) crucial issue	(has been) extensively studied
(a) current problem	importance/important
(a) dramatic increase	many
(an) essential element	most
(a) fundamental issue	much study in recent years
(a) growth in popularity	nowadays
(an) increasing number	numerous investigations
(an) interesting field	of great concern
(a) key technique	of growing interest
(a) leading cause (of)	often
(a) major issue	one of the best-known
(a) popular method	over the past ten years
(a) powerful tool/method	play a key role (in)
(a) profitable technology	play a major part (in)
(a) range (of)	possible benefits
(a) rapid rise	potential applications
(a) remarkable variety	recent decades
(a) significant increase	recent(ly)
(a) striking feature	today
(a) useful method	traditional(ly)
(a) vital aspect	typical(ly)
(a) worthwhile study	usually

(an) advantage attracted much attention benefit/beneficial commercial interest during the past two decades	well-documented well-known widely recognised widespread worthwhile

以下是这些如何使用的一些示例：

- A **major current focus** in population management is how to ensure sustainability of…
- **Numerous experiments have established that** ionising radiation causes…
- Low-dose responses to radiation have **generated considerable recent research interest**.
- Analysis of change in the transportation sector is **vital** for two **important** reasons: …
- PDA accounts for **over 95%** of all pancreatic cancers.
- **It is generally accepted that** joints in steel frames operate in a semi - rigid fashion.
- Nanocrystalline oxide films **are attracting widespread interest** in fields such as…
- **The importance of** strength anisotropy has been demonstrated by…
- Convection heat transfer phenomena **play an important role in** the development of…
- For **more than 100 years** researchers have been observing the stress - strain behaviour of…
- **Much research in recent years has focused on** carbon nanotubes.

2. 文献综述中用于呈现先前和/或当前研究及贡献的动词

achieve	develop	obtain
address	discover	overcome
adopt	discuss	perform
analyse	enhance	point out
apply	establish	predict
argue	estimate	present
assume	evaluate	produce
attempt	examine	propose
calculate	explain	prove
categorise	explore	provide
carry out	extend	publish
choose	find	put forward
claim	focus on	realise
classify	formulate	recognise
collect	generate	recommend
compare	identify	record
concentrate (on)	illustrate	report
conclude	implement	reveal
conduct	imply	revise
confirm	improve	review
consider	incorporate	show
construct	indicate	simulate
correlate	interpret	solve
deal with	introduce	state
debate	investigate	study
define	measure	support
demonstrate	model	suggest
describe	monitor	test
design	note	undertake
detect	observe	use
determine	prefer	utilise

以下是这些如何使用的一些示例：

- This phenomenon was demonstrated by…
- In their study, expanded T-cells were found in …
- Initial attempts focused on identifying the cause of…
- Weather severity has been shown to …
- Early data was interpreted in the study by…
- The algorithm has been proposed for these applications …
- The results on pair dispersion were reported in …
- Their study suggested a possible cause for…
- An alternative approach was developed by…

注意：在引言的最后，当你说明你在论文中计划做什么时，可以重复使用这些动词（见下面的4）。

3. 差距/问题/困扰/批评

这通常通过诸如然而、尽管、虽然、不过、尽管如此、但是等词语 来表示。

ambiguous computationally demanding confused deficient doubtful expensive false far from perfect ill-defined impractical improbable inaccurate inadequate incapable (of) incompatible (with) incomplete inconclusive inconsistent inconvenient incorrect	(the) absence of (an) alternative approach (a) challenge (a) defect (a) difficulty (a) disadvantage (a) drawback (an) error (a) flaw (a) gap in our knowledge (a) lack (a) limitation (a) need for clarification (the) next step no correlation (between) (an) obstacle (a) problem (a) risk (a) weakness

ineffective inefficient inferior inflexible insufficient meaningless misleading non-existent not addressed not apparent not dealt with not repeatable not studied not sufficiently + adjective not well understood not/no longer useful of little value over-simplistic poor problematic questionable redundant restricted time-consuming unanswered uncertain unclear uneconomic unfounded unlikely unnecessary unproven unrealistic unresolved unsatisfactory unsolved unsuccessful unsupported	(to be) confined to (to) demand clarification (to) disagree (to) fail to (to) fall short of (to) miscalculate (to) misjudge (to) misunderstand (to) need to re-examine (to) neglect (to) overlook (to) remain unstudied (to) require clarification (to) suffer (from) few studies have... it is necessary to... little evidence is available little work has been done more work is needed there is growing concern there is an urgent need… this is not the case unfortunately

以下是这些如何使用的一些示例：

- **Few researchers have addressed the problem** of…
- **There remains a need for** an efficient method that can…
- However, light scattering techniques have been **largely unsuccessful** to date.
- The high absorbance makes this **an impractical option** in cases where…
- **Unfortunately**, these methods do not always guarantee…
- **An alternative approach** is necessary.
- The function of these proteins **remains unclear**.
- These can be **time-consuming** and are often **technically difficult** to perform.
- **Although** this approach improves performance, it results in **an unacceptable** number of…
- Previous work has focused **only** on…
- However, the experimental configuration was **far from optimal**.

注意：这些词/短语中有些表达了非常强烈的批评。一个有用的练习 是，在你认为如果谈论你教授或导师的研究时可以使用的词旁边加 一个星号（*）。你也可以对它们进行修改，使其更加礼貌（例如 ， 代替“失败”，这是相当强烈的批评，你可以写“可能并不总是完 全成功”）。

(to) attempt (to) compare (to) concentrate (on) (to) conclude (to) describe (to) discuss (to) enable (to) evaluate (to) expect	(is) organised as follows: (is) set out as follows: (is/are) presented in detail (our) approach (the) present work (this) paper (this) project (this) report (this) section (this) study	(were/are) able to accurate/accurately effective/effectively efficient/efficiently excellent results innovation new novel method powerful practical

4. 本研究

(to) facilitate (to) illustrate (to) improve (to) manage to (to) minimise (to) offer (to) outline (to) predict (to) present (to) propose (to) provide (to) reveal (to) succeed	(this) work begin by/with close attention is paid to here overview	simple straightforward successful valuable
		aim goal intention objective purpose

以下是这些如何使用的一些示例：

- 这篇论文集中于 …
- 本研究的目的是描述和检验 …
- 为了研究生物学意义 …
- 在本文中，我们提出 …
- 新的相关性被开发出来，取得了优异的结果 … …
- 在本研究中，我们进行了 …
- 本文介绍了一种解决这些问题的方案。
- 我们在本研究中使用的方法旨在 …
- 本研究调查了 …
- 在本报告中，我们测试假设 …
- 本文的组织结构如下： …

注意：在论文或非常长的研究论文中，您可以使用这些来说明每个 章节或部分将要做什么。不要依赖于一刀切的动词，例如讨论；有

些章节/部分并不“讨论”任何内容，即使它们确实讨论，它们的主 要目的可能是比较事物、分析事物或描述事物，而不是讨论它们。

1.5 撰写引言

在接下来的任务中，您将汇集并使用本单元中的所有信息。您将根 据模型撰写引言，使用您所学的语法和词汇，因此请确保您面前有模型（第1.3.3节）和词汇（第1.4节）。

在本单元中，您已经看到传统的科研写作比直接从您自己的语 言翻译或更具创意的写作策略更容易学习、更容易写作，也更容易 让他人阅读。您已经学习了引言的传统模型，并收集了常用的词汇 。您的句型也应该是传统的；使用您在目标文章和这里打印的引言 中阅读的句子作为您写作中句型的模型，并根据任务进行调整。

这次请严格遵循模型。在你练习一两次之后，你可以根据自己 的需要进行调整。然而，你应该用它来检查你所写的引言，以确保 信息的顺序合适，并且你已经完成了读者在引言中期望你做的事情。

尽管在答案钥匙中提供了模型答案，但如果可能的话，您应该 尝试让英语母语者检查您自己的答案，以确保您正确使用了词汇。

1.5.1 撰写引言

想象一下，您刚刚完成了一项研究项目，设计了一种自行车罩，可以保护骑行者免受伤害、污染或雨水的侵袭。您可能提供了其使用的计算机模拟，或对通风系统进行了建模。您可能参与了空气动力学或罩体材料的聚合物结构设计，或者项目的其他任何方面。请撰写您研究论文的引言，该论文将在《踏板动力车辆杂志》（第三卷）上发表。您研究论文的标题为《单人踏板动力车辆的自行车罩》，引言应在200至400字之间。您可以虚构任何内容，当然，您需要创建虚假的

研究参考文献。尽量紧密遵循模型，使引言包含模型的四个主要组成部分，并尝试使用一些新词汇。

如果你卡住了，不知道接下来该写什么，可以使用模型和词汇 来帮助你继续前进。在你完成写作之前，不要查看答案。

1.5.2 关键

这是一个示例答案。当你阅读它时，思考每个句子中代表模型的哪个部分。

A COVER FOR THE SPPPV
(Single-Person Pedal-Powered Vehicle)

Concern about global warming and urban air pollution have become central issues in transport policy decision-making, and as a result much research in recent years has focused on the development of vehicles which are environmentally friendly. Air quality in cities is currently significantly lower than in rural areas[1] and this has been shown to be directly linked to the level of vehicle emissions from private cars.[2] Due to the fact that urban transport policy in the UK is designed to reduce or discourage the use of private cars,[3] there has been an increase in the sale of non-polluting vehicles such as the SPPPV (Single-Person Pedal-Powered Vehicle). However, although the number of SPPPV users has increased, safety and comfort issues need to be addressed if the number of users is to increase to a level at which a significant effect on environmental pollution can be achieved.

Researchers have studied and improved many aspects of the SPPPV. In 1980, Wang *et al*. responded to the need for increased safety by designing an SPPPV surrounded by a 'cage' of safety bars,[4] and in 2001 Martinez developed this further with the introduction of a reinforced polymer screen which could be fitted to the safety bars to protect the cyclist's face in the event of a collision.[5] The issue of comfort has also been addressed by many design teams; in 1998 Kohl *et al*. introduced an SPPPV with a built-in umbrella, which could be opened at the touch of

a button,[6] and more recently, Martinez[7] has added a mesh filter which can be placed over the entire cage to reduce the risk of environmental pollution. However, the resulting 'cage' or cover is aerodynamically ineffective due to the shape of the umbrella and the weight of the mesh filter.

In this study, we used computer simulation to model the aerodynamic effect of the existing safety and comfort features and we present a new design which integrates these features in an optimally-effective aerodynamic shape.

单元2 关于方法论的写作

2.1 结构

本节的标题在不同学科和不同期刊中有所不同。有时称为材料与方 法，或者可以称为*Procedure*, *Experiments*, *Experimental*, *Simulation*, *Methodology* or *Model*。 本节是研究文章中心“报告”部分的第一部分（第二部分是结果部 分），报告了您所做的和/或您所使用的内容。

大多数期刊（通常在互联网上）发布作者指南。在您开始阅读 本单元之前，请访问您定期阅读的期刊的指南——如果您运气好的 话，它将包括编辑在每个部分中期望的内容的简短描述，以及与图 表相关的技术信息。以下是此类指南中的一句典型句子：

> *The Methodology should contain sufficient detail for readers to replicate the work done and obtain similar results.*

确实，您的工作必须包含足够的细节以便可重复，但您需要进行的 写作类型不仅仅是您所做和/或使用的记录。您需要在写作方式上进行的最有趣和重要的变化之一是，直到现在，您可能一直在为比您 更了解您的研究主题的人（也许是您的老师）写作。您一直在向他 们展示您理解他们设定的任务并正确地执行了这些任务。然而，当您撰写研究文章时，人们将从您那里学习。因此，您现在需要能够 传达有关

新程序、新方法或新方法的信息，以便阅读它的每个人不仅能够执行并获得类似的结果，还能够理解并接受您的程序。

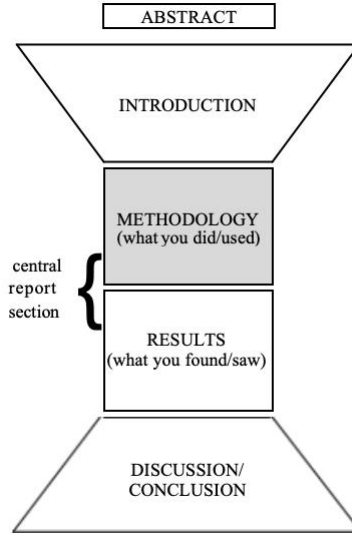


图 1. 研究文章或论文的结构。

当我们来问我们的三个问题时：

- 我该如何开始方法论/实验部分？我应该以什么类型的句子开头？
- 此部分应包含什么类型的信息，以及其顺序如何？
- 如何结束这一部分？

你已经知道，方法论应该包含你所做和/或使用的详细描述，这有助于回答三个问题中的第二个。然而，正如我们将看到的，这并不是一个完整的答案；为了有效并符合研究论文中通常的做法，这一部 分还必须包含其他重要信息。

请阅读下面的示例。论文的标题是《伦敦盆地石灰岩地下水化学的变化》。如果您对主题不熟悉，或者在理解个别单词时遇到困难，尤其是像*ground- water*这样的技术术语，请不要担心。在这个阶段，

只需尝试获得一个大致的理解，并熟悉所使用的语言类型。

Methodology

1 *The current investigation involved sampling and analysing six sites to measure changes in groundwater chemistry.* **2** *The sites were selected from the London Basin area, which is located in the south-east of England and has been frequently used to interpret groundwater evolution.*[2,3,4]

3 *A total of 18 samples was collected and then analysed for the isotopes mentioned earlier.* **4** *Samples 1–9 were collected in thoroughly-rinsed 25 ml brown glass bottles which were filled to the top and then sealed tightly to prevent contamination.* **5** *The filled bottles were shipped directly to two separate laboratories at Reading University, where they were analysed using standard methods suitably miniaturised to handle small quantities of water.*[5]

6 *Samples 10–18 were prepared in our laboratory using a revised version of the precipitation method established by the ISF Institute in Germany.*[6] **7** *This method obtains a precipitate through the addition of* $BaCl_2.2H_2O$*; the resulting precipitate can be washed and stored easily.* **8** *The samples were subsequently shipped to ISF for analysis by accelerator mass spectrometry (AMS).* **9** *All tubing used was stainless steel, and although two samples were at risk of CFC contamination as a result of brief contact with plastic, variation among samples was negligible.*

2.2 语法和写作技能

本节讨论了在方法论中重要的三个语言领域：

1. 被动语态和时态搭配
2. ‘A’ 和 ‘THE’ 的用法
3. 副词和副词位置

2.2.1 被动语态和时态搭配

当一个句子从主动语态变为被动语态时，它看起来像这样：

The dog bit the policeman. *active*
The policeman was bitten by the dog. *passive*

但在正式的学术写作中，当你报告你所做的事情时，在将句子从主动语态转换为被动语态时，你不会写“由我们”或“由我”。你只 需省略施动者，形成无施动者的被动语态：

We/I collected the samples. *active*
The samples were collected. *passive*

在您开始撰写您所做的工作和使用的材料的描述之前，您需要查看目标期刊的作者指南（if you are writing a doctoral thesis in an English-speaking country, check with your supervisor），以了解论文或论文的这一部分应该以被动语态还是主动 语态书写。如果您作为研究团队的一部分工作，可以使用主动语态 （*we collected*）。在撰写博士论文时，通常不适合使用主动语态，因 为您是独立工作的，研究通常不以第一人称单数（*I collected*）来撰写 。在大多数情况下，您会发现，在论文和论文中，您在研究中使用 的程序是以被动语态描述的，通常是现在简单被动（*is collected*）或 过去简单被动（*was collected*）。为了做出选择，探索每种语态的优 缺点是有用的。

在本节中，使用被动语态时有两种常见错误。首先，看看这两 个句子：

(a) *A flexible section is inserted in the pipe.* *Present Simple passive*
(b) *A flexible section was inserted in the pipe.* *Past Simple passive*

当您撰写您所做的工作和所使用的材料时，需要能够区分标准程序，即通常的做法或设备的标准构造，与您自己所做的事情。在上述例子中，（a）使用一般现在时来描述通常做的事情或研究中使用的标准设备，而（b）使用一般过去时来描述您自己所做的事情。在这一部分，通常使用被动语态，且不提及动作的执行者——我们不会在句子末尾添加“由研究者”或“由我”。

在正式写作中使用的被动语态通常是这种类型，即无代理被动。然而，由于没有给出代理，读者区分通常做的事情（句子（a））与您自己所做的事情（句子（b））的唯一方法就是使用正确的时态。请查看您的目标期刊，但在可能的情况下，通常使用一般现在时的被动语态来表示通常做的事情，而使用一般过去时的被动语态来指明您自己所做的事情，这样会更加清晰。

您可以看到，如果您不仔细注意这些句子的时态，您自己的工 作可能会与您所描述的标准程序混淆。这是一个非常常见的错误， 甚至在母语者中也会出现，并且会产生严重的后果。如果读者无法 识别您的贡献，那就是灾难！看看这个例子：

> *Two dye jets **are** placed in the laser cavity. A gain jet **is** then excited by an argon ion laser and the pulses **are** spatially filtered in order to obtain a Gaussian beam. Polarisation **is** confirmed using a polarising cube. The pulses **were** split into reference pulses and probe pulses and the reference pulses **were** carefully aligned into the detector to minimise noise levels.*

在这种情况下，“*splitting the pulses into two groups for testing*”是作者研究团队的重大创新，但读者知道这一点的唯一方法是时态从一般现在时的被动语态变化为一般过去时的被动语态（were split）。以下是另一个例子：

> *Samples for gas analysis **were collected** using the method described by Brown (1999), which **uses** a pneumatic air sampling pump.*

在描述您使用的程序并将其与其他研究者的工作进行比较时，使用被动语态会出现另一个困难。您可以使用过去时的无代理被动语态来描述您所使用的程序（*the samples* ***were collected*** *using a suction tube*），但您也可能需要使用完全相同的过去时无代理被动语态来描述您引用的其他研究者所使用的程序（*the samples* ***were collected*** *using a suction tube*）。这意味着，除非您非常小心，否则读者无法将您的工作与其他研究者的工作区分开来。您对自己所做工作的熟悉使得您的贡献对您来说是显而易见的——但对于读者来说，可能并不那么明显。

确保您的贡献清晰易识别的一种方法是通过措辞来标记它——例如，可以添加诸如"***In this study****, the samples were collected using a suction tube*"或"***In our experiments*** *the samples were collected using a suction tube*"这样的短语，并通过在句子的适当位置使用准确的引用来标识其他研究者所使用的程序（*In Brown (1999) the samples* ***were collected*** *using a suction tube*）。

有五种可能的用途您可能需要。注意不同的时态。

	What do you mean?	How can you make it clear?
1	*X was (collected/ substituted/ adjusted etc.*) by **me** in the procedure or work that **I** carried out	Either move to the active (*We collected/adjusted/ substituted etc.*) or add words or phrases such as *here/in this work/in our model* or use a 'dummy' subject such as *This experiment/The procedure*

2	*X was (collected/ substituted/ adjusted etc.*) by the person whose procedure or work I am using as a basis for, or comparing with, my own	Give a research reference and/ or add words/phrases such as *in their work/in that model*
3	*X is (collected/substituted/ adjusted etc.*) normally, *i.e.* as part of a standard procedure	You may need a research reference even if it is a standard procedure, depending on how well-known it is. Use phrases such as *as in* [5]

4	*X is (collected/substituted/ adjusted etc.*) as you can see in Fig. 1, but it was collected/ substituted/adjusted *etc.* by me	Move to the active (*We collected/adjusted/substituted etc.*) if you can or make sure that you come out of the Present Simple passive when you stop describing the figure
5	*X is (collected/substituted/ adjusted etc.*) by me in the procedure/work that I carried out, but my field requires authors to write procedural descriptions in the Present Simple tense. (This is quite common in pure mathematics)	Either move to the active (‘*We collect/adjust/substitute etc.*) or add words or phrases such as *here/in this work/ in our model* or use a ‘dummy’ subject such as *This experiment/The procedure*

2.2.2 ‘a’ 和 ‘the’ 的使用

这是一种英语语法和用法中最有问题的领域之一。许多语言没有单 独的词来表示“a”和“the”，即使有，这些词也可能与它们在英语 中的用法并不完全对应。学习英语作为第二语言的学生通常会被给 予以下有用但有时令人困惑的规则：

SINGULAR COUNTABLE NOUNS NEED A DETERMINER

一个限定词是像the 、a 、my 、this 、one、 some这样的词。这是一个 难以成功运用的规则，因为在使用之前需要解决两个问题。首先， 很难确切知道哪些名词是可数的；其次，即使你知道，如何决定使 用a还是the呢？

让我们来看第一个问题。决定哪些名词是可数名词，哪些不是,并不像看起来那么简单。许多名词通常被认为不可数的名词实际上可以以“可数”的方式使用。例如，像 死亡或童年这样的名词可以以复数形式出现：

*There have been three **deaths** this yearfrom pneumonia.*
*Our **childhoods** were very different; I grew up in France and she grew up in China.*

因此，像行业这样的名词也可以：

Many industries rely on fossilfuels.

甚至像钢这样的材料名称也可以以复数形式出现：

*Some **steels** are used in the manufacture of medical instruments.*

在以下不可数名词的列表中，标记那些也可以用复数形式表示的名词，即可数名词。你使用名词的方式决定了它是以可数形式还是不可数形式使用。因此，当你使用像 industry 这样的名词时，停下来思考——你是指一般的行业（不可数）还是某个特定的行业（可数）?在答案中检查你的答案。

absence	access	analysis	advice	age
agriculture	cancer	art	atmosphere	beauty
behaviour	duty	capacity	childhood	calculation
concern	economy	death	democracy	depression
design	environment	earth	education	electricity
energy	evidence	equipment	existence	experience
failure	fashion	fear	fire	health
food	freedom	history	growth	independence
heat	help	insurance	ice	knowledge

life	luck	philosophy	nature	loss
paper	organisation	pollution	physics	oil
power	progress	research	protection	policy
pressure	reality	security	respect	purity
rain	sand	strength	silence	safety
salt	science	time	stuff	sleep
swimming	space	trouble	trade	sunlight
transport	technology	waste	truth	traffic
vision	treatment	water	velocity	violence
wildlife	wind	work	wealth	welfare
industry	information	machinery	intelligence	light

关键 这些名词也可以具有可数意义，使用斜体字表示。

absence	access	*analysis*	advice	*age*
agriculture	*cancer*	*art*	*atmosphere*	*beauty*
behaviour	*duty*	*capacity*	*childhood*	*calculation*
concern	*economy*	*death*	*democracy*	*depression*
design	*environment*	earth	*education*	electricity
energy	evidence	equipment	*existence*	*experience*
failure	*fashion*	*fear*	*fire*	health
food	freedom	*history*	*growth*	independence
heat	help	insurance	ice	knowledge
industry	information	machinery	intelligence	*light*
life	luck	*philosophy*	nature	*loss*
paper	*organisation*	pollution	physics	*oil*
power	progress	research	protection	*policy*

pressure	*reality*	security	respect	*purity*
rain	*sand*	*strength*	*silence*	safety
salt	*science*	*time*	stuff	sleep
swimming	*space*	*trouble*	*trade*	sunlight
transport	*technology*	*waste*	*truth*	traffic
vision	*treatment*	*water*	*velocity*	violence
wildlife	*wind*	work	wealth	welfare

现在看看第二个问题：你如何决定使用 a 还是 the？你可能被告知 a 用于一般参考，而 the 用于特定参考，但在以下句子中：

*There is **a** book on the shelf above my desk; can you bring it here?*

一本书明确指的是一本特定的书；事实上，句子的那部分具体说明了说话者想要哪本书。因此，如果特定/一般标准无法帮助你选择 a 或 the，那还有什么呢？

首先问自己这个简单的问题：为什么在第一次谈论某件事时使用a，而在再次提及时使用the？毕竟，在这两种情况下指的是同一个特定的物品。例如，在下面的句子中，为什么对奶酪三明治的第一次提及使用a，而第二次提及使用the，尽管两者都指的是同一个特定 的三明治？

*I had **a** cheese sandwich and **an** apple for lunch. **The** sandwich was fine but **the** apple had a worm in it.*

区别在于，第一次说话者提到奶酪三明治或苹果时，只有说话者知道它们——但第二次时，说话者和听者都知道。然而，虫子对 听者来说是“新的”，因此用 a 来指代。现在我们可以添加一个新规则：

USE **THE** IF OR WHEN YOU AND YOUR READER BOTH KNOW WHICH THING/PERSON YOU MEAN.

这在事物或人之前没有被提及的情况下也是真实的，例如，在 以下句子中：

I arrived at Heathrow Airport but ***the*** *check-in was closed.*
I bought a new computer but ***the*** *keyboard wasfaulty.*

办理登机手续和键盘需要，因为一提到希思罗机场，发言者和听众 就知道并因此共享办理登机手续；一提到计算机，他们就共享键盘 。同样，在句子中：

He lit a match but theflame went out.

提到一个匹配会在读者的脑海中自动产生火焰的概念——这种共享 的理解通过使用“the”来标记。同样，如果我们在同一个房间里， 我告诉你抬头看天花板，你不会问我“你说的是哪个天花板？”因 为这显而易见；我们会共享它。

Did she get ***the*** *job?* (the job we both know she wanted)
I'll meetyou in ***the*** *library later.* (the library we normally use)

这里有一些更有用的规则：

USE **THE** IF THERE IS ONLY ONE POSSIBLE REFERENT

We removed ***the*** *softest layer of membrane.*
Cairo is ***the*** *capital of Egypt.*
The opening was located in ***the*** *centre of each mesh.*
Government policy is committed to protecting ***the*** *environment.*
The *sun's altitude is used to determine latitude.*

USE **A** IF IT DOESN'T MATTER *or* YOU DON'T KNOW *or* YOUR READER DOESN'T KNOW WHICH THING/ PERSON YOU ARE REFERRING TO.

A 35 ml brown glass bottle was used to store the liquid. (It doesn't matter which 35 ml brown glass bottle was used.)

The subject then spoke to an interviewer. (It doesn't matter which interviewer/I know which one but you don't.)

It works on the same principle as a combustion engine. (It doesn't matter which combustion engine.)

有时候，选择一个或改变句子的意思完全不同：

(a) *This effect may hide **a** connection between the two*. (There may possibly be a connection between the two but if there is, we cannot see it.)
(b) *This effect may hide **the** connection between the two*. (There is definitely a connection between the two but we may not be able to see it because of *this effect*.)

这里有另一对，其中选择 a 或 the 对意义有显著影响(∅ 在这里用于表示复数形式的 a）：

(a) *The nodes should be attached to ∅ two adjacent receptor sites*.
(There are many receptor sites and any two adjacent ones will do.)
(b) *The nodes should be attached to **the** two adjacent receptor sites*. (There are only two receptor sites.)

使用您刚刚学到的信息的最佳方法是从您正在阅读的研究文章中提 取一段，并利用本语法部分的信息来分析作者为何选择使用"the"或"a"的每个实例，或者为何在特定名词前没有使用任何限定词。

另一个重要的要点是，关于 a 、the 和∅ 的使用，它们都可以被通用地使用，即在表达一般真理时：

The electroencephalograph is a machine for measuring brain waves.
An electroencephalograph is a machine for measuring brain waves.
Electroencephalographs are machines for measuring brain waves.

最后一点说明：在辅音音素前使用 a，而在元音音素前使用 an 。这里重要的是发音，而不是拼写，因此我们写 an MRI 扫描，因为字母 'M' 的发音是 'em'，但写 a UV 灯，因为字母 'U' 的发音是 'yoo'。

2.2.3 副词和副词位置

当你用另一种语言交流复杂的想法时，明显的语法错误并不如看不见的错误那么糟糕。校对者或编辑会注意到明显的语法错误并进行更正，但如果句子用语法正确的英语写成，校对者和编辑就无法看 到错误。一个看不见的错误的例子是，句子在语法上是正确的，但 所选择的动词时态不合适或没有表达出作者的意图。这些隐藏的错 误令人担忧，因为作者和编辑/校对者都不知道它们的发生，但句子 并不意味着作者所想要表达的内容。

常见的隐藏错误包括在使用不定冠词 a 和定冠词the 时的错误(见上面的第 2.2.2 节），在关系从句中是否在单词 which 前使用逗号 ,以及副词位置错误。副词位置错误容易发生且难以检测。

副词并不总是按照你的意愿或期望行事。首先，需要介词的副 词可能会产生歧义（*Look at that dog* ***with one eye*** can either mean *USING one eye* or *HAVING one eye*），其次，副词可能会附着在句子的意外部分。注意你放置副词的位置，尤其是在一个句子中使用多个副词时要格外小心 。以下是你可能遇到的这类问题的一个例子：

The patient was discharged from hospital after being shot in the back with a 9 mm gun.

医生们射击她了吗?

He gave a lecture about liver cancer at the hospital last January.

讲座是在医院进行的——还是癌症？讲座是指发生在一月的癌症病例，还是讲座本身是在一月进行的？

尽管有副词位置的规则，但它们复杂且在写作时难以应用。由 于你的目标是保持安全并清晰地写作，最好避免像这些副词聚集， 并以不同的顺序重写信息。如果你的副词与整体相关句子（*i.e. clearly*, *last January*, *as a result*）然后考虑将副词放在句首：

Last January he gave a lecture about liver cancer at the hospital.

如果您仍然遇到模糊的副词簇，请考虑将句子分解为多个单元，每个单元都有自己的副词：

Last January he gave a lecture at the hospital; his subject was liver cancer.

2.3 写作任务：构建模型

2.3.1 构建模型

您现在准备开始构建方法论模型，通过在下面提供的空间中写下作 者在每个句子中所做的简短描述。关键在下一页。一旦您尝试生成自己的模型，您可以使用关键来帮助您在最终独立撰写研究文章时 编写这一部分。

指南

您应该花费 30-45 分钟来完成此任务。如果您无法想到第一句的好 描述，请选择一个更简单的，例如句子 4，并从那里开始。请记住， 您的模型只有在可以转移到其他方法论部分时才有用，因此不要包含内容词，例如地下水，否则您将无法使用您的模型生成您领域的 方法论部分。

找出作者在句子中所做的事情——而不是他/她所说的内容——的一种方法是想象你的电脑不小心删除了它。当它消失时，对你（ 作为读者）来说有什么不同？如果你在电脑上按下另一个键，句子 又出现了，这如何影响你对信息的反应？

另一种了解作者在句子中所做的事情——而不是他/她所说的内容——的方法是查看语法和词汇线索。主要动词的时态是什么？这 个时态通常用于什么？它与前一句的时态相同吗？如果不同，作者 为什么改变了时态？作者选择使用了哪些词？

不要期望能产生一个完美的模型。当你查看关键部分时，你会 修改你的模型，也许在你将其与目标文章中的方法论部分进行比较 时还会再次修改。

Changes in the chemistry of groundwater in the chalk of the London Basin

Methodology

1 *The current investigation involved sampling and analysing six sites to measure changes in groundwater chemistry.* **2** *The sites were selectedfrom the London Basin area, which is located in the south-east of England and has been frequently used to interpret groundwater evolution.*[2, 3, 4]

3 *A total of 18 samples was collected and then analysed for the isotopes mentioned earlier.* **4** *Samples 1–9 were collected in thoroughly-rinsed 25 ml brown glass bottles which were filled to the top and then sealed tightly to prevent contamination.* **5** *The filled bottles were shipped directly to two separate laboratories at Reading University, where they were analysed using standard methods suitably miniaturised to handle small quantities of water.* [5]

6 *Samples 10–18 were prepared in our laboratory using a revised version of the precipitation method established by the ISF Institute in Germany.*[6] **7** *This method obtains a precipitate through the addition of* $BaCl_2.2H_2O$*; the resulting precipitate can be washed and stored easily.*

In this sentence, the writer:

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 *The samples were subsequently shipped to ISF for analysis by accelerator mass spectrometry (AMS).* **9** *All tubing used was stainless steel, and although two samples were at risk of CFC contamination as a result of brief contact with plastic, variation among samples was negligible.*	8_____ 9_____

2.3.2 关键

In Sentence 1 '*The current investigation involved sampling and analysing six sites to measure changes in groundwater chemistry.*' the writer **offers a general overview of the entire subsection, including the purpose of the investigation.**

如果你在这里写了"引言"或"介绍方法论"，那么在你撰写 自己的论文或研究文章时，这并不会对你有所帮助，因为它并没有 告诉你在那句话中究竟该写些什么。

我为什么需要介绍方法论?

在某些情况下，作者会立即开始描述程序或材料。这在研究重点非 常狭窄且所有可能阅读的人都在进行类似研究时是合适的。如果情况并非如此，开始时提供一些介绍性材料会更友好。提供简短介绍 的目的是为了使读者顺利进入该部分。介绍方法论的方式有很多种 。以下是三种最常见的方式:

- 提供一个总体概述，概述工作的参数，例如测试的数量、使用的 设备/材料/软件，以及调查的目的。这有助于读者对本节有一个大 致的了解。
- 提供有关材料或材料/设备来源的背景信息。

• 请参考前一节中的内容。常见的选项是重申项目的目标或您希望 解决的问题。

如果你从一个总体概述或甚至一个关于所做和所用内容的一般段落 开始，那么可以进一步细分以产生详细信息。然而，如果你从细节开始，你就迫使读者将这些细节组合起来，以创建你所做和所用内 容的总体图景。这对读者来说是相当困难的，而且这不是他/她的工 作；作为作者，你的工作是以适当的顺序安排信息，以便读者能够轻松处理。

此外，要求读者将细节拼凑在一起，以创建你所做事情的图景 是有风险的，因为每个读者可能会在从细节"自下而上"开始时，创建出一个略有不同的过程图景，而不是从"自上而下"的总体概 述开始。当你使用"自上而下"的策略写作时，你掌控着局面。如 果你从关于所做/所用的总体陈述开始（*In all cases, Most sites*),你和你的读者共享相同的框架，因此当你填充细节时，你是在 为每个个体读者的脑海中创建相同的所做/所用的图景。记住：在开 始检查砖块之前，先向你的读者展示墙壁。

In Sentence 2 '*The sites were selected from the London Basin area, which is located in the south-east of England and has been frequently used to interpret groundwater evolution.*[2–4] **the writer provides background information and justifies the choice of location by referring to previous research.**

我为什么需要为我所做的事情辩解或给出理由？难道这不是显而易见的吗？

您的理由对您来说可能很明显，但对您的读者来说并不总是如此。 如果您未能为您的行为提供合理的解释，那么读者可能不会接受您选择的有效性。他们可能会想知道您为什么以特定的方式做事，或 者为什么使用特定的程序。这会产生负面影响：如果您不解释您为 什么

这样做，那么读者就不能期望接受您的方法论，这最终会影响 他们对您整篇论文的评估。

许多作者认为这一部分只是对所做或所用内容的客观描述；实际上，这里有很强的说服力和沟通元素。我们不仅在诸如“彻底” 或“小心”这样的语言中看到这一点，还在辩护的频率中看到了这 一点。在这一部分您需要在材料和方法的描述中，不仅要传达我所做的/使用的内容， 还要说明我做出这些决定的充分理由。合理的解释使读者能够信任 您所做的选择。

有时背景信息以一般现在时给出，以证明所做选择的合理性。例如，您可能选择了某种特定材料，因为它的特性；如果是这样，请说明这些特性是什么（*This material is able to…*）。您可能选择了特定的设 备或软件，因为它能做什么；如果是这样，请说明那是什么。在句 子2中，我们理解作者选择这个地理区域是因为它之前已被其他研究 人员验证为合适的地点。

In Sentence 3 ‘*A total of 18 samples was collected and then analysed for the isotopes mentioned earlier*’ **the writer provides an overview of the procedure/method itself.**

<u>如果我在本小节开始时给出了一个总体概述，为什么我还应该对程 序本身进行概述呢?</u>

正如您在第1.2.4节中看到的，段落的开头通常标志着新主题的开始 ,提供一个引言句是一种对读者友好的技巧。此外，第三句中的概述，像小节开头的概述一样，使作者能够通过创建一个一般框架以 “自上而下”的方式进行写作，从而使细节能够轻松地插入其中。 因为读者从一开始就知道测试了多少个样本以及对它们做了什么， 所以读者和作者共享同样清晰的画面。这些句子通常以“绝大多数 测试”或“在所有情况下”等短语开头（请参见第2.4.2节中的词汇表）。

In Sentence 4 '*Samples 1–9 were collected in thoroughly-rinsed 25 ml brown glass bottles which were filled to the top and then sealed tightly to prevent contamination.'* **the writer provides details about what was done and used and also shows that care was taken.**

我需要提供多少细节?

如果您不确定所有读者是否熟悉您方法论的具体细节，提供稍多一些信息而不是太少是更好的选择。在撰写研究报告时，您可能已经重复进行了多次实验或模拟，因此对材料、数量、设备、软件、程序的步骤顺序以及每个步骤所需的时间非常熟悉。由于这种熟悉性，某些具体细节（例如，第五句中瓶子的大小）对您来说可能是显而易见的，但对每位读者来说可能并不那么明显。如果您希望其他研究者能够重现您的工作并获得相似的结果，您应该包含每一个规格和细节。

请注意，在这句话中，作者使用了"彻底"、"装满到顶"和 "紧密"来向读者传达这项工作是经过仔细进行的。请记住，您撰 写论文的目标不仅是说明您所做的和发现的内容，还要确保您的读 者在论文的最后接受您的结论。为了做到这一点，读者必须接受您 的结果——但要接受您的结果，他/她必须首先接受您的方法论。因此，重要的是要将自己呈现为一位能够准确且细心地进行程序的合格研究者。

注意第4句中使用的*25 ml*。*ml*是国际单位制（Système International d'Unités）中毫升的符号。请检查国际单位制以确保您使用 的是正确的符号。数量/数字与国际单位制符号之间通常有一个空格 ;此外，尽管国际单位制符号看起来像缩写，但它们并不是，因此不应在后面加句号。

In Sentence 5 '*The filled bottles were shipped directly to two separate laboratories at Reading University, where they were analysed using standard methods suitably miniaturised to handle small quantities of water.*[5]*'* **the writer continues to describe what was done in detail, using language which communicates that care was taken.**

你能看到句子5中哪些词向读者传达了所花费的心思吗？作者本可以简单地写成“*The filled bottles were shipped to two laboratories and analysed using standard methods miniaturised to handle small quantities of water*”，但使用像直接 、分开和适当地这样的词语则传达了可靠性。

In Sentence 6 ‘*Samples 10–18 were prepared in our laboratory using a revised version of the precipitation method established by the ISF Institute in Germany.*[6]’ **the writer describes what was done by referring to existing methods in the literature.**

为什么我应该参考其他研究；为什么不只是描述我使用的方法？

一个原因是你不太可能完全独自创建你所使用的方法。在许多情况 下，其中一部分将来自于其他人使用或发现的方法，而他们的方法可能非常知名，因此如果你提供研究参考，就不需要给出每一个细节。因此，提供研究参考为你提供了一个捷径。你将在第2.4节的选 项1中找到相关词汇。

But if the reference is available in the literature, why does the writer need to give any details? Why can’t readers just go to the library, find the reference and read it themselves?

在这种情况下，作者提供了方法的基本细节，因为一些读者可能对 此不熟悉，并且并不总是适合让读者去图书馆或互联网查找参考资料。对于作者来说，描述他们所使用的程序、测试、设备或材料， 即使它们的使用方式与参考文献完全相同，这也是一种专业礼仪。 请记住，对于这种背景信息使用现在简单时态（*This method obtains*），而在回到描述你所做的事情时切换回过去简单时态。

在方法论部分，您材料和方法与其他研究者在同一领域的比较是一个合理的话题。通常，保持之前或当前研究程序在读者视野中 是很常见的，这样他们可以看到您的工作与该领域其他工作的不同 。您的方法要么与您提到的其他方法相同（词汇表中第2.4节的选项1),要么相似（词汇表中的选项2），要么显著不同，在这种情况下 ,您材料/方

法与其他研究者在同一领域的差异甚至可能代表您论文/ 论文本身的实际贡献（选项3）。

当你提到其他研究者的工作时，要注意参考标注在句子中的位 置；你可能会不小心将某人的工作归功于他们没有做的事情——甚 至可能是你的工作！请记住，参考标注并不总是放在句子的末尾。

有时提及您使用的程序的效果是合适或必要的。然而，在这个 阶段讨论或评论它们并不是一个好主意。如果您过于详细，可能会 导致在结果部分没有内容可写。有趣的是，通常在结果部分提供关 于方法论的进一步细节。有时方法论部分仅提供基本参数，而方法 本身则在结果部分与获得的结果相关联。

In Sentence 7 ' *This method obtains a precipitate through the addition of* $BaCl_2 2H_2O$*; the resulting precipitate can be washed and stored easily.*' **the writer provides more detailed information about the method and shows it to have been a good choice.**

在本节中，论证是很常见的；与之前一样，目标是回答可能对 您的选择提出的批评或疑问，确保读者相信您的选择是基于良好理 由做出的，并提供这些理由。我们经常看到对重要选择的论证，以 及拒绝替代选项的理由被详细说明。如前所述，这是因为您的读者 必须接受您对方法论所做的决策。

In Sentence 8 '*The samples were subsequently shipped to ISF for analysis by accelerator mass spectrometry (AMS).*' **the writer provides more details of the method.**

有趣的是，如前所述，您需要做的不仅仅是提供您所做的和使 用的细节；这是本节中唯一提供细节而没有其他内容的句子——每 个其他句子都有额外的功能。

In Sentence 9 '*All tubing used was stainless steel, and although two samples were at risk of CFC contamination as a result of brief contact with plastic, variation among samples was negligible.*' **the writer mentions a possible difficulty in the methodology**.

这难道不是在讨论所做工作的结果吗？

不，它实际上是在说方法论中的问题并没有影响结果。有时您确实 需要在这一部分提到结果，但仅在初步结果被用来修改或开发主要实验/模拟的设计时。

为什么我应该提到方法论中的问题？这不会让我看起来很糟糕吗？

事实上，情况正好相反。首先，如果你不提及你工作中的缺陷，可能会给人一种你对此毫不知情的印象，这会留下非常糟糕的印象。因此，如果你提到这些缺陷，你看起来会更专业。如果你忽视或试图掩盖缺陷（例如，数据集过小、设备或软件不理想），而你的读者注意到了这些，他们会开始怀疑你作为研究者的合法性，这会影响他们对你结果和结论的接受度。

其次，每当你完成一项研究时，你很可能已经从项目中遇到的 问题中学到了足够的知识，以便下次做得更好。你是否应该在重复 工作并改进技术时推迟写作？如果这次你也学到了更多；你是否应 该再次推迟？再一次？如果你这样做，你可能永远不会真正写出来 。一个可接受的选择是写出研究成果，并承认你遇到的问题或困难 。事实上，在这一部分提到这些问题不仅被认为是可接受的，实际 上在这里提到它们要比等到最后再提要好得多。在讨论未来工作的 建议时，首次提到局限性或缺陷被认为是不合适的。

但是我怎么能谈论我工作中的问题而不显得像个失败者呢？

使用能够减少问题、降低责任、突出积极方面并提出解决方案的词汇。在上面的例子中，作者承认存在问题，然后将其影响降到最低（样本之间的变异可以忽略不计）。这是处理需要谈论问题的一种标准方式。您可以在第2.4节的词汇列表中找到以传统、专业的方式提及问题和困难所需的语言示例。

2.3.3 模型

这里是我们收集的句子描述：

In Sentence 1 the writer offers a general overview of the subsection.

In Sentence 2 the writer provides background information and justification.

In Sentence 3 the writer provides an overview of the procedure / method itself.

In Sentence 4 the writer provides details about what was done and used and shows that care was taken.

In Sentence 5 the writer continues to describe what was done in detail, using language which communicates that care was taken.

In Sentence 6 the writer describes what was done by referring to existing methods in the literature.

In Sentence 7 the writer provides more detailed information bout the method and shows it to have been a good choice.

In Sentence 8 the writer provides more details of the method.

In Sentence 9 the writer mentions a possible difficulty in the methodology.

我们可以简化这些，使我们的模型具有四个基本组成部分。与介绍 模型不同，在介绍模型中，每个组成部分的所有项目都可能被使用,这个模型是一个“菜单”，您可以从中选择适合您的研究主题和 您提交的期刊的项目。如果您自己构建了设备，则无需“提供”组 件1中使用的设备的来源。如果没有问题，您根本不需要第四个组件。

1	PROVIDE A GENERAL INTRODUCTION AND OVERVIEW OF THE MATERIALS/METHODS RESTATE THE PURPOSE OF THE WORK GIVE THE SOURCE OF MATERIALS/EQUIPMENT USED SUPPLY ESSENTIAL BACKGROUND INFORMATION

2	PROVIDE SPECIFIC AND PRECISE DETAILS ABOUT MATERIALS AND METHODS (*i.e.* quantities, temperatures, duration, sequence, conditions, locations, sizes) JUSTIFY CHOICES MADE INDICATE THAT APPROPRIATE CARE WAS TAKEN
3	RELATE MATERIALS/METHODS TO OTHER STUDIES
4	INDICATE WHERE PROBLEMS OCCURRED

2.3.4 测试模型

下一步是查看该模型在真实的材料/方法部分（请记住，它可能不会 被称为材料和方法）以及您选择的目标文章中的工作方式。以下是一些来自真实研究文章的完整方法部分。通读它们，并在您认为看 到模型组件（1 、2、 3或4）的地方做标记。例如，如果您认为第一 句话对应于模型中的数字1，请在旁边写上1，依此类推。

Effects of H_2O on structure of acid-catalysed SiO_2 sol-gel films

Experimental procedure

Equal volumes of tetraethylorthosilicate (TEOS) and ethanol were mixed and stirred vigorously for 10 min at room temperature. Then 0.1 M HCl was gradually added to the solutions, until a water to TEOS molar ratio of $R = 2$ was attained. Additional deionised water was added to give solutions with $R = 3$, 4 and 5, so that for all solutions the molecular ration TEOS:HCl was maintained, as summarised in Table 1. The solutions were placed in the refluxing bath immediately after mixing, and the temperature of the bath was increased to 70°C in 15 min, while stirring, and kept there for 2 h. The solutions were then aged for 24 h at room temperature, before being diluted with an equal volume of EtOH and stirred for 10 min, to give the solution used for spin coating. All the chemicals were obtained from Aldrich Chemicals Ltd.

The sols were dispensed on p-type, 75 mm diameter silicon wafers, through a 0.1 μm filter (PTFE Whatman, obtained from BDH Merk Ltd), and thereafter the substrate was spun at 2000 rpm for 15 s. The coated substrate was baked at 100°C for 5 min, and then cleaved into 10 pieces. Each piece was baked in air at a different temperature, in the range from 100 to 1000°C, for 30 min. The samples were kept in covered petri dishes for a few days in room conditions before the experiments were continued; this allows the completion of surface hydroxylation, and gave reproducible ellipsometer results when water is used as an adsorbate.

The thickness and refractive index of the samples were measured using a Rudolph AutoEl III ellipsometer, with an operating wavelength of 633 nm, and precisions of about ±0.002 and ±3 Å in index and thickness, respectively. For microporous films, the measured index is strongly dependent on relative humidity, because of condensation of water in the pores. By mea - suring the dependence of index on humidity, information about porosity can be obtained. We have extended this technique to the use of different adsorbate species, in order to probe pore sizes [3]; this, for the sake of brevity, we call molecular probe ellipsometry. In this technique, the film is placed in a sealed chamber on the sample stage of the ellipsometer; first dry N2 gas is passed through the chamber to empty the pores of any condensed adsorbate, and then N2 having been bubbled through the liquid adsorbate is passed over the sample to fill the pores; in each case the refractive index is measured. By assuming that all the accessible pores in

dry and saturated atmospheres are completely empty or filled with adsorbate, respectively, the pore volume and index of the solid skeleton can be determined by an extension of the Lorentz-Lorenz relation [8] where nf, ns and np are the refractive indices of the film, solid skeleton and pores, respectively, and vp is the volume fraction porosity. Measurement of nf for both the dry and satu- rated films allows both vp and ns to be determined with the as- sumption that np has the same value as that of the bulk adsorbate in the saturated case, and of air (np = 1) in the dry case.

In order to empty the pores, an initial high flow rate of N2 was used for a few minutes and the rate was then reduced to 1000 sccm (standard c.c per minute) for 15 min. the flow rate was kept at 100 sccm for 15 min to fill the pores. The low flow rate in this case reduces the likelihood of cooling of the sample surface,

which could cause condensation on the external film surface. Comparison of the measured film thickness for wet and dry atmospheres indicated that this did not occur. The temperature inside the chamber was monitored by a thermocouple to ensure that there was no drift or alteration due to gas flow. In each case, the measurement was recorded once repeatable readings were obtained. The adsorbates used are listed in Table 2. Their average diameters were estimated using a combination of bond length data [9] and Van der Waals atomic radii [10]. All were obtained from Aldrich Chemical Ltd, except C24H44O8 obtained from Fluka Chemie AG.

The optical quality of the films was first studied qualitatively by visual examination, and by optical microscopy. The homogeneity of the films was then investigated quantitatively by measuring the intensity of scattered light resulting from oblique reflection of a laser beam from the film-coated silicon substrate. A helium-neon laser beam, having a wavelength of 633 nm, was directed onto the sample, through a chopping wheel, at an angle 59° from the normal. The specularly reflected beam was absorbed onto a black card, and the scattered light was collected at normal incidence to the sample using a ×10 microscope objective, and measured using a silicon photodiode and a lock-in amplifier. The position of lens and angle of incidence were fixed during measurements.

The film stress, σf, can be determined by measuring the resulting substrate curvature [11], according to Stoney's formula:

$$\sigma_f = (E_s t2_s/6(1 - v_s)t_f)(1/r_s - 1/r_f), \qquad (2)$$

where r_s and r_f are the radii of curvature of the bare substrate and substrate with film, respectively; E_s, t_s and v_s are the Young's modulus, thickness and Poisson's ratio of the silicon substrate, respectively, and t_f is the thickness of the film. Tensile stresses are positive and compressive stresses negative; thus, a positive radius of curvature denotes a convex film surface. Entire 75 mm diameter wafers were used, and curvature was measured from plots of surface profile along 30 mm lines over the central part of the film surface using a Dektak IIA auto-levelling profilometer. To reduce inaccuracy caused by lack of axial symmetry in the wafer curvature, two scans were made, in orthogonal directions, for each measurement, and the inverse radii thus obtained were averaged. Care was taken not to use wafers which had a substantially asymmetric curvature before deposition. Wafer

thicknesses, measured with a micrometer, were 390 ± 3 μm. Final film thicknesses were measured by ellipsometry and checked by patterned etching and profilometry, and interim thicknesses were estimated by interpolation. Equivalent single-layer thickness measurements indicate that the assumption that final thickness is proportional to number of layers is sufficiently accurate. For $E_s/(1 - v_s)$,the value 180 GPa was used [11].

In order to give an indication of the effect of water content on stress, 10 layers were deposited for each *R* value, using 10 s rapid thermal annealing at 1000°C in all cases.

Infrared imaging of defects heated by a sonic pulse

ii) Experiment

Our experimental setup is shown in Fig. 1. The source of the sonic excitation is a Branson, Model 900 MA 20 kHz ultrasonic welding generator, with a Model GK-5 hand-held gun. The source has a maximum power of 1 kW, and is triggered to provide a short (typically 50–200 ms duration) output pulse to the gun. The gun contains a piezoelectric transducer that couples to the specimen through the 1.3-cm-diam tip of a steel horn. In the laboratory setup, as can be seen in Fig. 1, we use a mechanical fixture to hold the sonic horn firmly against the sample surface. This setup uses a machine slide to provide reproducible alignment of the horn. Typically, a piece of soft Cu sheet is placed between the tip of the horn and the specimen to provide good sound transmission. The location of the source on the sample is chosen primarily for convenience of geometrical alignment, and since it has minimal effect on the resulting sonic IR images, typically is not changed during the course of the inspection. Sound waves at frequencies of 20 kHz in metals such as aluminium or steel have wavelengths on the order of tens of centimetres, and propagate with appreciable amplitude over distances much longer than a wavelength. For typical complex-shaped industrial parts (see, for example, the aluminium automotive part shown in Fig. 1), reflections from various boundaries of the specimen introduce countless conversions among the vibrational modes, leading to a very complicated pattern of sound within the specimen during the time that the pulse is applied. Since the speed of sound in solids is typically on the order of a few km/s, this sound field completely insonifies the regions under inspection during the

time that the excitation pulse is applied. If a subsurface interface is present, say a fatigue crack in a metal, or a delamination in a composite structure, the opposing surfaces at the interface will be caused to move by the various sound modes present there. The complexity of the sound is such that relative motion of these surfaces will ordinarily have components both in the plane of the crack and normal to it. Thus, the surfaces will 'rub' and 'slap' against one another, with a concomitant local dissipation of mechanical energy. This energy dissipation causes a temperature rise, which propagates in the material through thermal diffusion. We monitor this dissipation through its effect on the surface temperature distribution. The resolution of the resulting images depends on the depth of the dissipative source as well as on the time at which the imaging is carried out.

The IR camera that we used in the setup that is shown in Fig. 1 is a Raytheon Radiance HS that contains a 256× 256 InSb focal plane array, and operates in the 3–5 μm spectral region. It is sensitive (with a 1 ms integration time) to surface temperature changes of ~0.03°C, and can be operated at full frame rates up to 140 Hz with that sensitivity. We have also observed the effects reported here with a considerably less expensive, uncooled, microbolometer focal plane array camera, operating in the long wavelength (7–10 μm) of the IR.

The height of biomolecules measured with the atomic force microscope depends on electrostatic interactions

MATERIALS AND METHODS

Biological samples

Aquaporin-1 (AQP1) from human erythrocyte solubilized in octyl-f3-glucopyranoside was reconstituted in the presence of Escherichia coli phospholipids to form two-dimensional (2D) crystalline sheets (Walz et al., 1994). The 2D crystals were prepared at a concentration of-0.5 mg protein/ml and 0.25 mg/ml lipid in 0.25 M NaCl, 20 mM MgCl2, 20 mM 2-(N-morpholino) ethanesulfonic acid (MES) (pH 6).

Hexagonally packed intermediate (HPI) layer from Deinococcus radiodurans, a kind gift of Dr. W. Baumeister, was extracted from whole cells (strain SARK) with lithium dodecyl sulfate, and purified on a Percoll density gradient (Baumeister et al.,

1982). A stock solution (1 mg/ml protein) was stored in distilled water at 4°C.

Purple membranes of Halobacterium salinarium strain ET1001 were isolated as described by Oesterhelt and Stoeckenius (1974). The membranes were frozen and stored at −70°C. After thawing, stock solutions (10 mg protein/ml) were kept in distilled water at 4°C.

Porin OmpF trimers from E. coli strain BZ 1 10/PMY222 (Hoenger et al., 1993) solubilized in octyl-polyoxyethylene were mixed with solubilised dimyristoylphosphatidylcholine (99% purity;

Sigma Chemical Co., St. Louis, MO) at a lipid-to-protein ratio (w/w) of 0.2 and a protein concentration of 1 mg/ml. The mixture was reconstituted as previously described (Hoenger et al., 1993) in a temperature-controlled dialysis device (Jap et al., 1992). The dialysis buffer was 20 mM HEPES, pH 7.4, 100 mM NaCl, 20 mM MgCl2, 0.2 mM dithiothreitol, 3 mM azide.

1,2-Dipalmitoyl-phosphatidylethanolamine (DPPE) from Sigma was solubilized in chloroform:hexane (1:1) to a concentration of 1 mg/ml. The resulting solution was diluted in buffer solution (150 mM KCl, 10 mMTris, pH 8.4) to a concentration of 100 µg/ml.

Layered crystals

MoTe2, a layered crystal of the family of transition metal dichalcogenides (Wilson and Yoffe, 1969), was employed to calibrate the piezo scanner of the AFM. It was prepared by chemical vapor transport (CVT), with chlorine or bromine as carrier gases in a temperature gradient of 100°C across the quartz ampule (Jungblut et al., 1992), and was a kind gift of Y. Tomm.

Muscovite mica (Mica New York Corp., New York) was used as the solid support for all samples. Mica minerals are characterized by their layered crystal structure, and show a perfect basal cleavage that provides atomically flat surfaces over several hundreds of square microns. Their hydrophilicity and relative chemical inertness (Bailey, 1984) make them suitable for the adsorption of biological macromolecules.

Atomic force microscopy

A commercial AFM (Nanoscope III; Digital Instruments, Santa Barbara, CA), equipped with a 120-µm scanner (j-scanner) and a

liquid cell, was used. Before use, the liquid cell was cleaned with normal dish cleaner, gently rinsed with ultrapure water, sonicated in ethanol (50 kHz), and sonicated in ultrapure water (50 kHz). Mica was punched to a diameter of −5 mm and glued with water-insoluble epoxy glue (Araldit; Ciba GeigyAG, Basel, Switzerland) onto a Teflon disc. Its diameter of 25 mm was slightly larger than the diameter of the supporting steel disc. The steel disc was required to magnetically mount the sample on to the piezoelectric scanner.

Imaging was performed in the error signal mode, acquiring the deflection and height signal simultaneously. The deflection signal was minimized by optimizing gains and scan speed. The height images presented were recorded in the contact mode. The scan speed was roughly linear to the scan size, at 4–8 lines/s for lower magnifications (frame size 1–25 μm). The applied force was corrected manually to compensate for thermal drift. To achieve reproducible forces, cantilevers were selected from a restricted area of one wafer. The dimensions of one tip were measured in a scanning electron microscope to calculate the mechanical properties of the cantilever (Butt et al., 1993). The 120-μm-long cantilevers purchased from Olympus Ltd. (Tokyo, Japan) had a force constant of k = 0.1 N/m, and the 200-μm-long cantilevers purchased from Digital Instruments had a force constant of 0.15 N/m. All cantilevers used had oxide-sharpened Si3N4 tips.

Sample preparation

To minimize contamination of surfaces during exposure to ambient air, sample supports were prepared immediately before use. All buffers were made with ultrapure water (−18 MDcm−1; Branstead, Boston, MA). This water contains fewer hydrocarbons than conventional bidistilled water and fewer macroscopic contaminants, both of which can influence the imaging process. Chemicals were grade p.a. and purchased from Sigma Chemie AG (Buchs, Switzerland). The buffers used were Tris-(hydroxymethyl)-aminomethane (from pH 10.2 to pH 7.2), MES (from pH 6.5 to pH 5.5), and citric acid (from pH 5.4 to pH 3.0). Macromolecular samples were checked before use by conventional negative stain electron microscopy (Bremer et al., 1992) and/or by sodium dodecyl sulfate-gel electrophoresis.

The samples were diluted to a concentration of 5–10 μg/ml in buffer solution (pH 8.2, 20 mMTris-HCl, 2100 mM; monovalent electrolyte; except for DPPE, which was not further diluted) before

adsorption to freshly cleaved mica. After an adsorption time of 10–60 min, the samples were gently washed with the measuring buffer to remove weakly attached membranes. This allowed height measurements at low electrolyte concentrations, at which

samples adsorb sparsely to mica (Muller et al., 1997a and 1997b). Experiments requiring constant pH were performed at pH 8.2. The isoelectric points of bacteriorhodopsin, AQP1, DPPE, and OmpF are 5.2 (Ross et al., 1989), 6.95 (calculated), −10 (Tatulian, 1993), and 4.64 (calculated), respectively. Thus, at this pH, all samples had a net negative charge, except for DPPE, which had a net positive charge.

现在在你的目标文章中做同样的事情。我们希望你能获得模型的良 好确认，并且现在可以回答第2.1节中的问题：

- 我该如何开始这一部分？我应该以什么类型的句子开头？
- 此部分应包含什么类型的信息，以及其顺序如何？
- 如何结束这一部分？

2.4 词汇

为了完成您需要撰写论文这一部分的信息，您现在需要为模型的每个部分找到合适的词汇。本节中的词汇来自600多篇不同领域的研究文章，这些文章均由母语者撰写并发表在科学期刊上。仅包含频繁 出现的单词/短语；这意味着词汇表中包含的单词和短语被作者和编 辑都视为正常和可接受的。

在下一节中，我们将研究模型的以下七个领域的词汇：

1. 提供材料/方法的一般介绍和概述，并给出所用材料/设备的来源

这包括诸如*In this study, most of the samples were tested using a…* as well as verbs such as *were supplied by*。一份常用词汇和表达的良好清单将鼓励您在开头几句中包含这些内容。

2. 提供必要的背景信息

此列表提供用于描述仪器、设备或地点的词汇和短语，包括“*parallel to*”和“*equidistant*”等项。这些信息至关重要，因为读者需要它们来想象或重现您的工作。

3. 提供关于材料和方法的具体和精确细节（即数量、温度、持续时间、顺序、条件、地点、大小）

这包括具体描述您所做/使用的动词。与其仅写“被完成”或“被使用”，不如使用更具体的动词，如“优化”或“提取”，这样可以更清楚地解释您究竟做了什么，从而节省时间。

4. 证明所做选择的合理性

这包括引入您所做选择理由的短语，例如“*in order to*”。它还包括一系列动词，具体说明您选择的优势，如“*enable*”和“*facilitate*”。

5. 表明采取了适当的措施

这包括形容词（*careful*）以及副词（*carefully*），以便在构建句子时提供最大灵活性。

6. 将材料/方法与其他研究关联

这为您提供了区分程序/材料/测试的方法，以便于区分与其他研究人员使用的完全相同的、与其他研究人员使用的相似的，以及与其他研究人员使用的显著不同的程序/材料/测试。

7. 指出问题发生的地方

此列表包括减少问题的方式、减少您的责任、最大化好的方面以及对问题提出解决方案的方法。

2.4.1 词汇任务

查看本单元中的方法论部分以及目标文章中的方法论或实验部分。 对所有内容进行下划线或高亮处理。您认为可以在上述七个领域中使用的词语和短语。

在接下来的页面中可以找到有用语言的完整列表。这包括您突 出显示的所有适当单词和短语，以及一些其他常见的单词和短语。 请仔细阅读它们，并在字典中查找您不认识的任何词汇的含义。这 个列表在许多年里都会很有用。

2.4.2 方法论部分的词汇

1. 提供材料/方法的一般介绍和概述，并给出所用材料/设备的来源

您需要的一些词汇在引言词汇表中；例如，描述您所做/使用的许多动词可以在那里找到。

这些动词分为三类：第一类包括与学术研究相关的一般动词， 如 *attempt, consider, conduct, determine, investigate, report, suggest, verify* ，这些大多数可以在引言词汇表中找到。第二类包含指定你所做的动作的动词 ,如c*alculate, extract, isolate, formulate, incorporate, modify, plot, simulate*，这些可以在下面的词汇表中找到。第三类包括特定于你的领域和研究的动 词，但在其他领域不太有用，例如*clone, dissect, isotype, infuse*。还可以尝试：

all (of) both (of) each (of) many (of) most (of) the majority(of)	(the) tests (the) samples (the) trials (the) experiments (the) equipment (the) chemicals (the) models (the) instruments (the) materials	is/are commercially available was/were acquired (from/by) was/were carried out was/were chosen was/were conducted was/were collected was/were devised was/were found in was/were generated (by) was/were modified was/were obtained (from/by)
		was/were performed (by/in) was/were provided (by) was/were purchased (from) was/were supplied (by) was/were used as supplied was/were investigated

以下是这些如何使用的一些示例：

- **The impact tests used in this work** were a modified version of…
- **All reactions** were performed in a 27 ml glass reactor…
- **All cell lines** were generated as previously described in…
- **In the majority of the tests,** buffers with a pH of 8 were used in order to…
- **Both experiments** were performed in a greenhouse so that…
- The substrate **was obtained from** the Mushroom Research Centre…
- SSCE glass structures **were used** in this study to perform…
- The cylindrical lens **was obtained from** Newport USA and is shown in Fig. 3.
- **The material investigated** was a standard aluminium alloy; **all** melts were modified with sodium.
- Topographical examination **was carried out** using a 3-D stylus instrument.
- **The experiments were conducted** at a temperature of 0.5ºC.

2. 提供必要的背景信息

除了描述您可能需要的标准程序和技术外，您还需要描述您使用或构建的设备/仪器。为了准确做到这一点，您需要对空间位置的语言有良好的掌控。确保您知道如何使用下面的单词/短语。如果您不确 定，请写下字典定义，并使用语料库取样器（您可以在互联网上找到）查看它们是如何使用的。

opposite	facing		
out of range (of)	within range (of)		
below	under	underneath	
above	over	on top (of)	
parallel (to/with)	perpendicular (to)	adjacent (to)	
on the right/left	to the right/left		
(to) bisect	(to) converge	(to) intersect	
near side/end	far side/end		
side	edge	tip	end
downstream (of)	upstream (of)		
boundary	margin	border	
on the front/back	at the front/back	in the front/back	in front (of)
higher/lower	upper/lower	inner/outer	
horizontal	vertical	lateral	
circular	rectangular	conical	
equidistant	equally spaced		
on either side	on both sides	on each side	
is placed	is situated	is located	occupies
is mounted (on)	is coupled (onto)	is fastened (to)	is positioned
is aligned (with)	is connected (to)	is fixed (to)	is embedded
extends	is surrounded (by)	is fitted (with)	is encased (in)
is attached to	is covered with/by	is joined (to)	

以下是这些如何使用的一些示例：

- Porosity was measured **at the near end and at the far end** ofthe polished surface.
- The compression axis **is aligned with** the rolling direction…
- The source light was polarised **horizontally** and the sample beam can be scanned **laterally**.
- The mirrors **are positioned near** the focal plane.
- Electrodes comprised a 4 mm diam disk ofsubstrate material **embedded in** a Teflon disk of 15 mm diam.

- The intercooler **was mounted on top of** the engine…
- The concentration of barium decreases **towards the edge**…
- Similar loads were applied to **the front and side** of the box…
- A laminar flow element **was located downstream of** the test section of the wind tunnel…

以下哪个句子中，桌子离墙壁最近?

The table was placed against the wall.
The table was placed next to the wall.
The table was placed flush with the wall.
The table was placed in contact with the wall.
The table was placed right against the wall.
The table was placed alongside the wall.

在下面的哪个句子中，时钟离门最近?

The clock was located just above the door.
The clock was located slightly above the door.
The clock was located immediately above the door.
The clock was located directly above the door.
The clock was located right above the door.

Note that *half as wide (as) = half the width (of); half as heavy (as) = half the weight (of); twice as long (as) = twice the length (of) and twice as strong (as) = twice the strength (of). Also note that with/having a weight of 20 kg = weighing 20 kg and with/having a width/length of 20 cm = 20 cm wide/long*.Note that *half as wide (as) = half the width (of); half as heavy (as) = half the weight (of); twice as long (as) = twice the length (of) and twice as strong (as) = twice the strength (of). Also note that with/having a weight of 20 kg = weighing 20 kg and with/having a width/length of 20 cm = 20 cm wide/long.*

3. 提供关于材料和方法的具体和精确细节

这些动词分为三类：第一类包括在学术研究中使用的一般动词，如*attempt, consider, conduct, determine, investigate, report, suggest, verify*，这些动词可 以在引言词汇表中找到（第1.4节）。第二类包含特定于您的领域和 研究的技术动词，但这些动词并不实用。在其他领域，例如*anneal, calibrate, centrifuge, dissect, fertilise, ionise, infuse*。这些在

这里不予列出，因为它们通常不太有用。第三类是一组不 太技术性的动词，指定了所做的或使用的内容，例如*calculate, extract, isolate,formulate, incorporate, modify,plot, simulate*。这些通常出现在被动语态中（*was/were isolated*），并可以在下面的词汇表中找到。

was adapted	was divided	was operated
was added	was eliminated	was optimised
was adopted	was employed	was plotted
was adjusted	was estimated	was positioned
was applied	was exposed	was prepared
was arranged	was extracted	was quantified
was assembled	was filtered	was recorded
was assumed	was formulated	was regulated
was attached	was generated	was removed
was calculated	was immersed	was repeated
was calibrated	was inhibited	was restricted
was carried out	was incorporated	was retained
was characterised	was included	was sampled
was collected	was inserted	was scored
was combined	was installed	was selected
was computed	was inverted	was separated
was consolidated	was isolated	was simulated
was constructed	was located	was stabilised
was controlled	was maintained	was substituted
was converted	was maximised	was tracked
was created	was measured	was transferred
was designed	was minimised	was treated
was derived	was modified	was varied
was discarded	was normalised	was utilised
was distributed	was obtained	

4. 证明所做的选择

because* by doing … , we were able to chosen for (+ noun) chosen to (+ infinitive) for the purpose of (+ -ing or noun)** for the sake of (+ -ing or noun) in an attempt to (+ infinitive) in order to (+ infinitive) it was possible to (+ infinitive) offer a means of (+ -ing) one way to avoid... our aim was to (+ infinitive)	provide a way of (+ -ing) selected on the basis of… so as to (+ infinitive) so/such that so (+ -ing) thereby (+ -ing) therefore* thus (+ -ing) to (+ infinitive) to take advantage of which/this allows/allowed *etc.* with the intention of (+ -ing)

*请参见第1.2.2节以获取其他信号语言的示例 **请参见下面的框以获取有 用动词的不定式、-ing形式和名词形式。 ∅ 表示在这种结构中名词形式不 可用或不常见。

INFINITIVE	-ING FORM	NOUN FORM
achieve	achieving	achievement
allow	allowing	∅
assess	assessing	assessment
avoid	avoiding	avoidance
compensate for	compensating for	compensation for
confirm	confirming	confirmation
determine	determining	determination
enable	enabling	∅
enhance	enhancing	enhancement
ensure	ensuring	∅
establish	establishing	establishment
facilitate	facilitating	facilitation

guarantee	guaranteeing	guarantee
identify	identifying	identification
improve	improving	improvement
include	including	inclusion
increase	increasing	increase
limit	limiting	limitation
minimise	minimising	∅
obtain	obtaining	
overcome	overcoming	∅
permit	permitting	
prevent	preventing	∅
provide	providing	∅
reduce	reducing	
remove	removing	prevention
validate	validating	provision
		reduction
		removal
		validation

以下是这些如何使用的一些示例：

- **To validate** the results from the metroscale model, samples were collected from all groups.
- The method of false nearest neighbours was selected **in order to determine** the embedding dimension.
- **For the sake of** simplicity, only a single value was analysed.
- **By partitioning** the array, all the multipaths could be identified.
- Zinc oxide was drawn into the laminate **with the intention of**enhancing delaminations and cracks.
- **The advantage of** using three-dimensional analysis was that the out-of - plane stress field could be obtained.
- **Because** FITC was used for both probes, enumeration was carried out using two different slides.
- The LVDTs were unrestrained, **so allowing** the sample to move freely.
- The cylinder was constructed from steel, **which avoided** problems of water absorption.

5. 指出采取了适当的措施。

下面框中的大多数项目是副词形式，但它们也以形容词形式出现(*e.g. accurate*）。

accurately always appropriately at least both/all carefully completely constantly correctly directly	every/each exactly entirely firmly frequently freshly fully gently good identical	immediately independently individually never only precisely randomly rapidly reliably repeatedly	rigorously separately smoothly successfully suitably tightly thoroughly uniformly vigorously well

以下是这些如何使用的一些示例：

- A mechanical fixture was employed to hold the sonic horn **firmly** in place.
- After being removed, the mouse lungs were frozen and thawed **at least** three times.
- The specimen was monitored **constantly** for a period af 24 hours.
- They were then placed on ice for **immediate** FACS analysis.
- **Frequent** transducer readings were taken to update the stress conditions smoothly.
- The samples were **slowly and carefully** sheared to failure.

6. 将材料/方法与其他研究相关联

有三种方式可以将您的材料/方法与其他研究中使用的材料/方法相关联。

选项 1：您使用的程序/材料与您引用的完全相同。

according to as described by/in* as explained by/in as in as proposed by/in	as reported by/in as reported previously as suggested by/in can be found in details are given in	given by/in identical to in accordance with the same as that of/in using the method of/in

*由和的通常后面跟着研究者或研究团队的名字（由Ross或使用Ross等人的 方法），而在通常后面跟着工作（在Ross等人（2003）中）。另一种选择 是在句子的适当位置简单地给出研究引用，可以用括号或上标数字。

选项 2：您使用的程序/材料与您引用的相似。

a (modified) version of adapted from based in part/partly on based on essentially identical in line with in principle in essence more or less identical slightly modified	(very) similar almost the same essentially the same largely the same practically the same virtually the same with some adjustments with some alterations with some changes with some modifications	(to) adapt (to) adjust (to) alter (to) change (to) modify (to) refine (to) revise (to) vary

选项 3：您使用的程序/材料与您引用的显著不同。

a novel step was … adapted from* based on* in line with	although in many ways similar although in some ways similar although in essence similar	(to) adapt* (to) adjust* (to) alter* (to) change*

loosely based on partially based on partly based on*	with the following modifications/changes:	(to) refine* (to) revise (to) vary* (to) modify*

*如您所见，这些可以在选项2和选项3中使用。当您在选项2中使用它们时 ,如果您使用的程序/材料与您引用的程序/材料之间的差异不显著，您可能 不需要说明这些差异。在选项3中，这些差异或修改是显著的，您应该说明 它们是什么，特别是如果它们是改善了程序/材料的修改。

以下是这些如何使用的一些示例：

- Developmental evaluation was carried out using the Bayley Scales of Infant Development **(Bayley, 1969)**.
- The size of the Gaussians was adjusted **as in (Krissian *et al.*, 2000)**.
- The centrifuge is a **slightly modified** commercially available model, the Beckman J6-HC.
- The protein was overexpressed and purified **as reported previously.**[10,12]
- **A revised version of** the Structured Clinical Interview (4th edition)[6] was used.
- **We modified** the Du and Parker filter to address these shortcomings and we refer to this modified filter as the MaxCurve filter.
- In our implementation **we followed** Sato *et al*. (1998) by using a discrete kernel size.

7. 指出问题发生的地方

minimise **problem** did not align precisely only approximate	**minimise** **responsibility** limited by inevitably	**maximise** **good aspects** acceptable fairly well

it is recognised that less than ideal not perfect not identical slightly problematic rather time-consuming minor deficit slightly disappointing negligible unimportant immaterial a preliminary attempt not significant	necessarily impractical as far as possible (it was) hard to (it was) difficult to unavoidable impossible not possible	quite good reasonably robust however* nevertheless* **talk about a solution** future work should… future work will… * currently in progress currently underway

*在“*future work should*”和“*uture work will.*”这两个短语之间存在一个有趣的区别。当你写“*future work should*”时，你是在为未来的工作建议一个方向，并邀请你所在领域的研究社区接受挑战并进行研究。当你写“*future work will*”时，你是在向研究社区传达你自己的计划和意图，应该理解这些计划 和意图属于你——你是在对其他研究社区说“别碰！”并描述你自己的研 究计划。

以下是这些如何使用的一些示例：

- **Inevitably**, considerable computation was involved.
- Only a brief observation was feasible, **however**, given the number in the sample.
- **Although** centrifugation could not remove all the excess solid drug, the amount remaining was **negligible**.
- Solutions using (q = 1) differed **slightly** from the analytical solutions.
- Continuing research **will** examine a string of dc-dc converters to determine if the predicted efficiencies can be achieved in practice.
- **While** the anode layer was **slightly** thicker than 13 μm, this was a **minor deficit**.

2.5 编写方法论部分

在接下来的任务中，您将整合并使用本单元中的所有信息。您将根据模型撰写方法论部分，使用您所学的语法和词汇，因此请确保您面前有模型（第2.3.3节）和词汇（第2.4节）。

在本单元中，您已经看到了方法论的传统模型，并收集了传统 使用的词汇。请记住，当您写作时，您的句型也应该是传统的，因 此请使用本单元中方法论示例和您目标文章中看到的句型作为您写 作的模型。

这次请严格遵循模型，今后也要用它来检查你工作的研究方法 ,以确保信息的顺序恰当，并且你在这一部分做了读者期望你做的 事情。

尽管在答案钥匙中提供了模型答案，但如果可能的话，您应该 尝试让英语母语者检查您自己的答案，以确保您正确使用了词汇。

2.5.1 编写方法论部分

这项任务的目的是让您学习如何描述您所做的工作和使用的材料，以便任何读者都能准确地重复您所做的事情，并获得与您相同的结果。请记住，您需要展示您在工作中采取了适当的谨慎，并且您有充分的理由去做您所做的事情。信息是：这正是我所做的，我是小心翼翼地完成的，并且我有充分的理由以这种方式进行。

为了完成这项任务，想象您正在撰写一项研究项目，该项目首次尝试烹饪鸡肉。想象一下，直到现在，所有人都吃生鸡肉。任务是撰写一个鸡肉烹饪的食谱，就像它是研究论文的材料/方法部分一样。

作为一个例子，您可以考虑先概述整个过程，而不是直接写“*Cut the chicken into four pieces*”。您可以提到鸡肉的来源，比如是从超市购买的，还是由实验室提供的。您还需要说明用什么工具来切鸡肉；使用斧头和使用4厘米的Sabatier钢刀会产生非常不同的效果！而不是写“*Now put the chicken in a hot oven for about an hour and a half*”，您应该写类似于：“*The sample was then placed on a 300 × 600 mm stainless steel sheet and heated in a Panasonic E458 × 500 w standard fan- assisted oven for 90 minutes at 350° C .*”

如果您不知道如何烹饪鸡肉也不必担心——如果您报告说是用伏特加煮的也没关系，但您必须提供您所用伏特加的确切数量和品牌名称，以便他人可以复制您的方法和结果。请记得使用被动语态和适当的时态。

您报告新过程的研究论文标题为：**AN APPROACH TO THE PREPARATION OF CHICKEN.**。您论文的引言如下：

Introduction

Chicken preparation techniques are used in a range of applications both in homes and in restaurants. Chicken is easily available and can be locally produced in most areas; in addition it is easily digested and low in calories.[1]

Since Dundee's pioneering work reporting the 'natural' method of chicken preparation (Dundee et al., 1990) in which the chicken was killed and then eaten raw with salt, there have been significant innovations. Much work has been carried out in France in relation to improving the method of slaughtering chickens,[2] *whereas in the USA researchers have concentrated on improving the size of the bird.*[3,4] *The 'natural' method is widely used since the time required for the process is extremely short; however, some problems remain unsolved. The flavour of chicken prepared using the Dundee method is often considered unpleasant*[5] *and there is a well-documented risk of bacterial infection*[6] *resulting from the consumption of raw meat.*

The aim of this study was to develop a preparation method that would address these two problems. In this report, we describe the new method, which uses seasoning to improve the flavour while heating the chicken in order to kill bacteria prior to eating.

Now write the Methodology section of this paper. You should write approximately 250–400 words. If you get stuck and don't know

what to write next, use the model and the vocabulary to help you move forward. Don't look at the Key until you have finished writing.

2.5.2 关键

这是一个示例答案。当你阅读它时，思考每个句子中代表模型的哪个部分。

Two experiments were carried out using different combinations of seasoning and varying cooking temperatures. A 4.5 kg frozen organic chicken was purchased from Buyrite Supermarket. Buyrite only sell grade 'A' chickens approved by the Organic Farmers Association, thus ensuring both the homogeneity of the sample and the quality of the product. Seasonings were obtained from SeasonInc UK and were used as supplied.

According to the method described by Hanks *et al*. (1998), the chicken was first immersed in freshly boiled water cooled to a temperature of 20°C and was subsequently rinsed thoroughly in a salt solution so as to reduce the level of bacteria on the surface of the chicken.[7] In order to obtain two samples of equal size and weight for testing, the chicken was first skinned using a standard BS1709 Skin-o-matic; the flesh was then removed from the bone with a 4 cm steel Sabatier knife, after which it was cut into 3 cm-cubes, each weighing 100 g.

Two of the cubes thus obtained were randomly selected for testing. The cubes were dried individually in a Phillips R2D2 Dehydrator for 10 minutes. Immediately after removing each cube from the dehydrator it was coated with the selected seasoning mixture[8] and left to stand on a glass plate for 30 minutes at room temperature (16°C) in order to enhance absorption of the seasoning prior to heating. Seasoning quantities were measured used standard domestic kitchen scales and were therefore only approximate.

Each cube was then placed on an ovenproof dish and transferred to a pre-heated Panasonic Model 33KY standard electric fan-assisted oven at 150°C for 10 minutes. The product

was removed from the oven and allowed to come to equilibrium, after which the cubes were assessed according to the TTS test developed by Dundee (Dundee, 1997).

单元 3 结果写作

3.1 结构

本节的标题在不同学科和不同期刊中有所不同。它有时被称为“分 析”或“数据分析”，而不是“结果”。下表显示了从这一点到研究论文结束的四个副标题选项。

Option 1	Option 2	Option 3	Option 4
Results *or* Data Analysis	Results *or* Data Analysis	Results and Discussion	Results *or* Data Analysis
Discussion	Discussion	Ø	Discussion and Conclusion(s)
Conclusion(s)	Ø	Conclusion(s)	Ø

在所有情况下，本节报告您对所发现或观察到的内容的评论， 如果副标题包含“讨论”一词（即结果与讨论），则包括部分或全部讨论。与方法论部分一样，选择适当副标题的最佳方法是查看您定期阅读的期刊的作者指南。

在大多数情况下，您的工作结果可以用图表、表格、方程或图 像来呈现。那么，您为什么还要费心写一个结果部分呢？为什么不 简单地提供清晰的图表或表格，并附上清晰的标题和几条注释呢？ 思考这些问题是开始理解您应该写些什么的好方法。

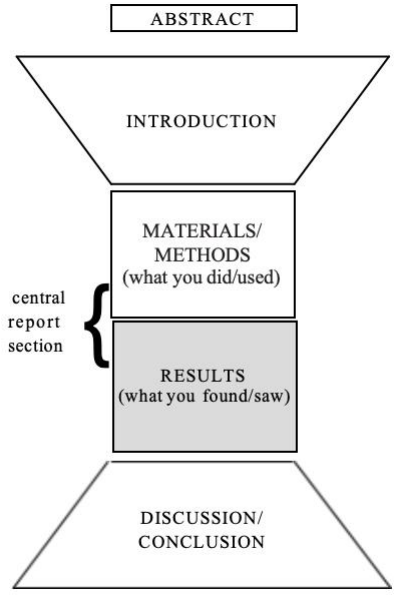


图 1. 研究文章或论文的结构。

在本节中。几乎每个人都会写结果部分，因此很明显，有些事情仅仅通过使用表格、图形或其他结果图像是无法实现的。它们只能通 过使用文字来实现。

撰写结果部分有很多原因。首先，您的某些结果可能比其他结果更有趣或更重要，而在表格或图形中很难传达这一点。此外，将您的结果与研究的目标相关联是至关重要的。第三，在某些情况下,您可能想提供背景信息，以解释为什么会出现特定结果，或将您的结果与其他研究者的结果进行比较。此外，您的结果可能存在问题；也许某些实验并未完全成功，您想提出可能的原因。

然而，撰写结果部分而不是依赖图表、表格和其他图像的最重 要原因之一是，您必须向读者传达您对结果的理解和解释。结果并 不能自我说明；如果可以的话，您的结果的表格或图形就足够了。 您的读者不必同意您的观点，但他们需要了解您对结果的看法和理解。

所以当我们来问我们的三个问题时：

- 如何开始结果部分？我应该以什么类型的句子开头？ 与？
- 此部分应包含什么类型的信息，顺序如何？
- 如何结束这一部分？

您已经知道这一部分包含了一些关于您发现或观察的评论，而不仅 仅是对您发现和观察的描述，这有助于回答第二个问题。

请阅读下面的结果部分。论文的标题是：**A modelling approach to traffic management and CO exposure during peak hours**.。不要担心如果你对这个主题不熟悉，或 者如果你在理解某些词汇时遇到困难，特别是像中位数暴露这样的 技术术语。在这个阶段，只需尝试获得一个大致的理解，并熟悉所 使用的语言类型。

Results

1 *Data obtained in previous studies*[1,2] *using a fixed on-site monitor indicated that travel by car resulted in lower CO exposure than travel on foot.* **2** *According to Figo et al. (1999), the median exposure of car passengers was 11% lower than for those walking.*[2] **3** *In our study, modelled emission rates were obtained using the Traffic Emission Model (TEM), a CO-exposure modelling framework developed by Ka.*[3] **4** *Modelled results were compared with actual roadside CO concentrations measured hourly at a fixed monitor.* **5** *Figure 1 shows the results obtained using TEM.*

6 *As can be seen, during morning peak-time journeys the CO concentrations for car passengers were significantly lower than for pedestrians, which is consistent with results obtained in previous studies.*[1,2] **7** *However, the modelled data were not consistent with these results for afternoon journeys.* **8** *Although the mean CO concentrations modelled by TEM for afternoon journeys on foot were in line with those of Figo et al., a striking difference was noted when each of the three peak hours was considered singly (Fig. 2).*

9 *It can be observed that during the first hour (H1) of the peak period, journeys on foot resulted in a considerably lower level of CO exposure.* **10** *Although levels for journeys on foot generally exceeded those modelled for car journeys during H2, during the last hour (H3) the levels for journeys on foot were again frequently far lower than for car journeys.*

在您开始构建模型之前，请阅读以下关于语法和写作技巧的部分。

3.2 语法和写作技能

本节讨论了结果部分中四个重要的语言领域：

- 序列
- 频率
- 数量
- 因果关系

3.2.1 序列

为了让其他研究人员能够准确地重复你的工作并将他们的结果与你 的结果进行比较，你需要能够以非常精确的方式描述你所做的事情 和发现的顺序和时间顺序。时间顺序意味着每一步花费了多长时间 以及它在序列中的位置。你不能仅仅使用“然后”或“接下来”； 这些词告诉你的读者事件发生的顺序，但它们并未提供关于每个事件持续了多长时间、 下一个事件发生得有多快或它在序列中的位置的信息。对时间顺序 的清晰理解将帮助读者想象并为自己重复这一过程。

可以传达顺序的词语和短语可以分为八组。

1）第一组包含指代 在您开始实验/模拟之前或在您开始观察结果之前发生的事件的词语或短语：

*It was apparent **beforehand** that a reduction in temperature would be a desirable outcome.*

2）第二组表示实验/模拟的开始或描述的第一个结果：

***At the beginning** the temperature was stable, as predicted.*

3）第三组包含表示事件发生顺序但不提供时间间隔信息的单词或短语：

*The temperature increased to 49。C and **then** dropped to 30。C.*

在这种情况下，温度下降可能是在达到 49°C 后很快发生的，也可能经过了很长时间；单词“然后”仅仅告诉读者这些事件发生的顺序。

4）第四组用于表明两个事件之间（仅仅）间隔了很短的时间：

*The temperature increased to 49。C but **soon** dropped to 30。C.*

5）第五组用于表明事件之间的时间间隔较长，或事件发生在序列的后期：

*The temperature increased to 49。C and **later** dropped to 30。C.*

6）第六组非常有用且重要。它包含一些单词和短语，用于表达事件同时或几乎同时发生，或者在同一时间段内发生。因此，这组中的词语有时也用来传达事件之间可能存在的因果关系：

*The temperature dropped sharply **when** we reduced the pressure.*

（7）第七组用于标志事件序列的结束：

***At the end** there was a noticeable drop in temperature.*

（8）最后一组指代在实验/模拟结束或观察结果结束之后发生的事件：

*At the end there was a noticeable drop in temperature but it was decided **afterwards** to omit itfrom the input data.*

以下是用于表达事件顺序的单词和短语列表：

after afterwards as as soon as at first at that point at the beginning at the end at the same time at the start beforehand before long earlier eventually finally	firstly formerly immediately in advance in the beginning in the meantime in the end initially just then lastly later later on meanwhile next once originally	previously prior to secondly shortly after simultaneously soon straight away subsequently then to begin with to start with towards the end upon when while

现在将它们放入一个（或多个）适当的组中。每个组中都有一个示 例已作为指南输入到框中，并且某些单词或短语可以出现在多个组中。

1. 在开始之前

beforehand

2. 开始或第一步

at the beginning

3. 步骤/顺序

then

4. 不久之后

soon

5. 在较晚的阶段；经过一段时间/更长的时间

later

6. 一个点/时期几乎或完全与另一个同时发生

when

7. 结束或最后一步

at the end

8. 在结束后

afterwards

关键

1. 在开始之前

beforehand earlier formerly in advance	originally previously prior to

2. 在开始/第一步

at first at the beginning at the start firstly	in the beginning initially to begin with to start with

3. 步骤/顺序

after afterwards earlier next once	previously prior to secondly etc subsequently then

4. 不久之后

before long shortly after	soon

5. 在较晚的阶段；经过一段时间/更长的时间

eventually in time later	later on subsequently towards the end

6. 一个时间点/时间段与另一个几乎或完全同时发生。

as as soon as at that point at the same time immediately in the meantime just then	meanwhile simultaneously straight away upon + -ing when while

7. 在最后一步/最后阶段

at the end eventually	finally lastly

8. 在结束后

afterwards eventually	in the end later later on

3.2.2 频率

明确传达特定事件或结果发生的频率也是非常重要的。如果某个结果在*on every occasion*进行测试时都发生，那么这是一项非常可靠的结果；如果在进行测试时“有时”发生，那就是一个可靠性较低的结果。

在方法学部分，如果你写到“*x was done*”但没有说明频率，读者可能无法准确复现你的方法。在结果部分，如果你写到“x发生”但未加频率描述，读者可能无法将他们的结果与你的进行比较。最重要的是，如果读者不知道某一结果的发生频率，他们可能无法正确评估你的结果。

以下的频率语言列表按照从100%频率（*on every occasion*）到0%频率（*never*）排列。然而需要注意的是，频率语言通常是以主观方式使用的：如果某事被描述为“经常”发生，这可能是相对于预期的发生频率而言的。换句话说，如果之前的研究表明某一结果几乎不可能发生，而在你的研究中发现其发生率高达18%，你可能会认为这是一个“频繁”发生的现象。另一方面，如果之前的研究表明某一事件很可能发生，而在你的研究中其发生率仅为57%，你可

能会认为这是一个“相对罕见”的现象。尽管频率术语具有客观含义，但它们也可以以主观方式使用。

在以下列表中可以识别出一个中点：短语**“as often as not”用于表示某事发生的频率与其未发生的频率相等，即中性频率**。列表中出现在该50%中点以上的短语表示正向频率，而中点以下的短语表示负向频率。不过，除了第一个组和最后一个组外，列表中的项无法以精确的百分比频率进行量化。

此列表被分为11组，每组包含意义基本相同的表达。

1.	each/every time without exception on each/every occasion always invariably
2.	habitually as a rule generally normally usually
3.*	regularly repeatedly

4.*	frequently often commonly
5.	more often than not
6.	as often as not **(neutral frequency)**

7.	sometimes on some occasions at times
8.	occasionally now and then from time to time
9.	rarely seldom infrequently
10.	hardly ever barely ever almost never scarcely ever
11.	on no occasion not once at no time never

*第3类和第4类中的词语含义比其他类别的更灵活。

看看每组中的单词/短语如何影响句子的意思。想象一下，你想在一个星期一的早晨找到你的主管，并且你想知道是否应该在图书 馆寻找他。

1. If he **always** goes to the library on Monday mornings you will find him there today.
2. If he **generally** goes to the library on Monday mornings you expect to find him there today and you will be surprised if he is not there.
3. If he **regularly** goes to the library on Monday mornings you will probably find him there today.
4. If he **often** goes to the library on Monday mornings there is a good chance that you may find him there today.
5. If he goes to the library **more often than not** on Mondays, you should start by looking for him there, but he may not be there today.
6. If he goes to the library **as often as not** on Monday mornings you may find him there today — or you may not. It's impossible

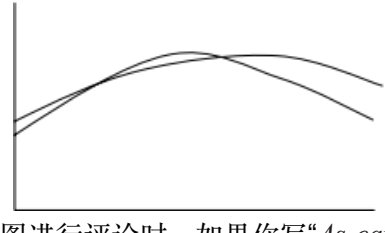
to predict because the chances are equal; he goes there as often as he doesn't go there.

7. If he **sometimes** goes to the library on Monday mornings perhaps he will be there today (but you won't be surprised if he isn't there).
8. If he **occasionally** goes to the library on Monday mornings he might be there today but it's unlikely.
9. If he **rarely** goes to the library on Monday morningshe probably won't be there today (so don't bother to look for him there).
10. If he **hardly ever** goes to the library on Monday mornings he is not expected to be there today, and you would be surprised to find him there.
11. If he **never** goes to the Library on Monday morningshe won't be there today.

3.2.3 数量

文字具有惊人的力量，可以鼓励人们形成强烈的印象。想象一下， 例如，你在一个聚会上，有人对你说："来见见我的邻居，他因谋 杀在监狱里待了10年。"当你见到邻居时，他的脸可能看起来相当 可怕。然而，如果你事先被告知："来见见我的邻居，他给穷人很 多钱"，他可能看起来像一个善良和关心他人的人。

您用来描述结果的语言与表格和图形本身一样强大，甚至可能 更强大。请看下面图中的两条曲线：



当你对这个图进行评论时，如果你写"*As can be seen in the figure, the two curves are very similar*"，读者将会关注曲线之间的相似性，因此它们看起来会 很相似。然而，如果你写"*As can be seen in the figure, the two curves are noticeably different*"，读 者将会关注

它们之间的差异，因此它们看起来会很不同。你对结果 的评论告诉读者你对这些结果的看法，并影响读者对它们的感知方 式。

结果并不能自我说明！您可以用数字或百分比来描述您的结果 ,但这些数字或百分比已经在图表中对读者可见；读者需要知道这 些数字或数量的含义，以便理解它们。例如，如果您的结果的表格 或图形显示您所寻找的效果在23%的案例中发生，您可以将其传达 为一个强有力的结果（*in **as many as** 23% of cases*）或一个弱结果（*in **only** 23% of cases*），但如果您只是写：如图1所示，效果发生在23%的案 例中，您并没有为读者能自己看到的内容添加任何信息。

失去这个机会来传达你的结果意味着什么可能会导致问题。如 果你不用文字描述或评论你的结果，读者可能会与您有不同的理解 。换句话说，如果你写道"*As can be seen in Fig. 1, the effect occurred in 23% of cases*" ,尽管你可能认为这是一个高百分比，但读者可能会认为*23% of cases*是低的，反之亦然。这将对你论文的其余部分产生不利影响，特 别是对你的结论。你希望读者接受你的结论，而这些结论应该逻辑 上和自然地从你的结果中得出。如果你不对你的结果进行评论，以 便读者能够分享你对它们的理解，他/她可能会

以不同的方式看待它们。因此，您最终从这些结果中得出的结论将 不会显得自然或合乎逻辑；实际上，这对读者来说甚至可能显得令 人惊讶或相当奇怪。

传达您对结果的解释的一种方式是使用第3.2.2节中的频率列表 中的语言。例如，您可以写成：*As can be seen in Fig. 1, the effect was seen on 23% of occasions*,，不如写：

> *The effect was seen **frequently*** (if you believe that 23% of occasions is evidence of a high level of frequency), or

The effect was seen ***occasionally*** (if you believe that 23% of occasions is evidence of a low level of frequency).

另一种传达您对所描述图表中数字、水平和数量的评论的方法 是使用数量语言。数量语言可以用来替代数字（*many*），或者可以 用来评论数字（*as many as 45*）。传达数量的词语和短语可以分为五个组。

1）第一组包含使大小/数量看起来较大的词语或短语：

A ***considerable*** *amount of residue remained in the pipe.*

2）第二组包含使大小/数量看起来较小的词语或短语：

Barely *23% of the residue remained in the pipe.*

3）第三组用于强调大小/数量的多/少或高/低：

The amount that remained was ***even higher/even lower*** *than predicted.*

4）第四组用于表示大小/数量与另一数据相似或接近：

Almost all/Almost half *of the residue remained in the pipe.*

5. 第五组在需要描述数量但不想明确表示其大小时非常有用：

Some *of the residue remained in the pipe.*

Here is a list of words/phrases which can be used in this way:

a great deal (of)
a few
a little
a number (of)
appreciable
appreciably (higher/lower)
approximately
as many as (*e.g.* 45)
as few as (*e.g.* 45)
at least
barely
below
by far
close (to)
considerable
considera
bly
(higher/lo
wer)
easily

(over/under)
even (higher/lower)
exceptionally (high/low)
extremely (high/low)
fairly (high/low)
far (above/below)
few
fewer (than)
greater (than)
hardly
infinitesimal
in some cases
just
just (over/under)
less
little
marginal
marginally (higher/lower)
marked
markedly
moderate
more (than)
most
much
nearly
negligible
noticeable
noticeably
numerous
only
over (half/25%)
particularly
plenty
practically
quite
reasonably
relatively
significant
significantly
slight
small
so (high/low)
some
somewhat
substantial
substantially
to some extent
under
upwards of
virtually
well (under/over)

现在将它们放入上述描述的适当组中。您可以通过想象该词/短语用 于描述图中的数据来做到这一点，例如：*As can be seen in Fig. 1, a substantial amount of residue remained in the pipe*。某些词/短语可以用于多个类别；例如，词“*much*”：如 图1所示，*As can be seen in Fig. 1, much of the residue remained in the pipe* (Group 1)，以及*As can be seen in Fig. 1, the amount of residue remaining in the pipe was much lower than expected* (Group 3)。每组中给出了一个示例作为指南。

1. 增加大小/数量的词或短语

most

2. 减少大小/数量的词或短语

below

3. 强调大小/数量有多大/多小/多高/多低的词或短语

very

4. 表示大小/数量与另一个相似/接近的词或短语

almost

5. 表达不愿意对大小/数量的解释做出承诺的词语或短语

some

关键

1. words or phrases which **increase** the size/quantity:

a great deal (of)
a number (of)
as many as (45)
appreciable
at least
considerable
greater (than)
marked
more (than)
most
numerous
over (half/25%)
plenty
much
substantial
significant
upwards of

2. words or phrases which **reduce** the size/quantity:

a few
a little
as few as 45
barely
below
few
fewer (than)
hardly
infinitesimal
little
less
marginal
negligible
only
slight
small
under

3. words or phrases which **emphasise** how big/small/high/low the size/quantity is:

appreciably
by far
considerably
easily (over/under)
even (higher/lower)
exceptionally (high/low)
extremely (high/low)
far (above/below)
particularly
so (high/low)
substantially
well (under/over)

4. words or phrases which communicate that the size/quantity is **similar/close to another**:

approximately
close (to)
few
little (*i.e.* close to none)
nearly
practically

few (*i.e.* close to none)	slightly
just (over/under)	virtually

5. words or phrases which communicate **a reluctance to commit oneself** to an interpretation of the size/quantity:

fairly	reasonably
in some cases	relatively
moderate	some
quite	somewhat
rather	to some extent

3.2.4 因果关系

当你描述你的结果时，可能需要指出你观察到的事件之间的关系或联系。有时你可以清楚地说明一个事件导致了另一个事件，而在其他情况下，你可能想说一个事件导致了另一个事件，但你没有证明它们之间因果关系的证据。本节旨在为你提供多种语言选项，以帮助你表达对观察到的事件之间关系的理解。在"*x produced y*"中，主语 x 是原因，宾语 y 是结果；在"*x originated in y*"中，x 是结果，y 是原因。然而在其他情况下，例如"*x is linked to y*"，这取决于作者想要表达的内容；x 既可以是原因也可以是结果，或者作者可能只是想表明 x 和 y 以某种方式相互关联。

在某些动词或短语中，原因和结果的位置是固定的。例如，下面列表中的一些动词/短语传达了明确/强烈的因果关系（如*cause, produce, be due to*）。一些动词/短语指的是部分原因（如*be a factor in, contribute to*），一些则指的是因果链中的初始或首要原因（如*originate in, initiate*）。列表中还有一些动词和短语传达了较弱的因果关系（如*be related to, link*）。当你想指出特定事件或现象之间存在某种联系，但可能不确定哪个是原因、哪个是结果时，这些表达是很有

用的。你甚至可能不确定它们之间的联系是否确实是因果关系。在表格中，这些动词和短语用星号（*）标记，并非所有这些动词都可以用于被动语态，但在可以使用被动语态的情况下，表中也提供了相关信息。

请注意：

- to be **a** cause of or **a** result of something implies that other factors were also involved, whereas to be **the** cause of or **the** result of something implies that it is the only cause or result.
- *x results from y* means *x is a consequence of y; whereas result in y* means *y is a consequence of x*

(be) a/the cause of	create/(be) created
(be) a/the consequence of	derive/(be) derived
(be) a factor in	effect/(be) effected
(be) a/the result of	elicit/(be) elicited
(be) due to	give rise to
accompany/(be) accompanied*	generate/(be) generated
account for/(be) accounted for	influence/(be) influenced
affect/(be) affected	initiate/(be) initiated
arise from	link/(be) linked*
ascribe to/(be) ascribed to	originate in
associate/(be) associated*	produce/(be) produced
attribute to/(be) attributed to	relate/(be) related*
bring about/(be) brought about	result from
cause/(be) caused	result in
come from	stem from
connect to/(be) connected to*	trigger/(be) triggered
contribute to	yield

因果陈述（如“*x caused y*”）具有一定风险，因为它们可能在后续阶段被证伪。因此，科研写作发展出了许多方法来降低作者在做出此类陈述时的责任。其中一种方法是弱化因果动词，例如，不说“*x caused y*”，而选择说“*x was linked to y*”。以下是通过“弱化”因果陈述来降低风险和责任的其他方法：

你可以以以下短语之一开头：

It appears that … It can/may* (therefore) be inferred/assumed that… It is (very/highly/extremely) probable/likely that … It is (widely/generally) accepted that… It is/maybe reasonable to suppose/assume that … It is/maybe thought/recognised/believed/felt that… It is/may/can be assumed that… It seems (very/highly) probable/likely that… It seems (likely) that… It would seem/appear that … The evidence points to the likelihood/probability that… The evidence suggests that… There is a clear/good/definite/strong possibility that… There is evidence to indicate that… This implies/seems to imply/may imply that… Apparently, (therefore), There seems to be/is a tendency to It is thought/said/recognised that	x caused y.

*关于这种动词，称为情态动词的内容将在下一单元中详细介绍。另一种选择是添加频率限定词：

x often caused y
x commonly caused y
x rarely caused y

或数量限定符：

x caused y in many cases
x caused y in some cases/to some extent
x caused y in virtually all cases

或情态动词：

x may have caused y
x might have caused y
x could have caused y

你可以在一个句子中使用多个情态动词，具体取决于你希望你的陈述有多“weak”——但要小心；如果添加过多，句子可能完全没有意义：

The evidence points to the possibility that in many cases, x can contribute to certain types of y.

3.3 写作任务：构建模型

3.3.1 构建模型

您现在准备开始构建结果部分的模型，通过在下面提供的空间中写 下作者在每个句子中所做的简短描述。关键在下一页。一旦您尝试制作自己的模型，您可以使用关键来帮助您在最终独立完成时撰写 研究文章的这一部分。

指南

你应该花30到45分钟完成这个任务。如果你想不出第一句的好描述，可以选择一个更简单的句子，例如句子5，然后从那个句子开始。你的模型只有在能够迁移到其他结果部分时才有用，因此不要包含像“traffic”这样的内容词，否则你将无法用你的模型生成自己领域的结果部分。

记住，了解作者在句子中做了什么，而不是在说什么的一种方法是想象你的电脑不小心删除了这句话。当它消失时，作为读者，你的感受会有什么变化？如果你按下另一键，句子又重新出现，这会如何影响你对信息的反应？

如前面部分所述，找出作者在句子中做了什么——而不是在说什么——的另一种方法是查看语法和词汇线索。主语动词的时态是什么？这个时态通常用于什么？它是否与前一句的时态相同？如果不同，为什么作者改变了时态？作者选择了哪些词汇？

不要期望产生一个完美的模型。当你查看答案时，你会修改你的模型，或者在比较它与目标文章中结果部分的写作方式时，可能还会再次修改。

A modelling approach to traffic management and CO exposure during peak hours	**In this sentence, the writer:**
Results	
1 *Data obtained in previous studies[1,2] using a fixed on-site monitor indicated that travel by car resulted in lower CO exposure than travel on foot.* **2** *According to Figo et al. (1999), the median exposure of car passengers was 11% lower than for those walking.[2]* **3** *In our study, modelled emission rates were obtained using the Traffic Emission Model (TEM), a CO-exposure modelling framework developed by Ka.[3]* **4** *Modelled results were compared with actual roadside CO concentrations measured hourly at a fixed monitor.* **5** *Figure 1 shows the results obtained using TEM.*	1 _____ 2 _____ 3 _____ 4 _____ 5 _____
6 *As can be seen, during morning peak-time journeys the CO concentrations for car passengers were significantly lower than for pedestrians, which is consistent with results obtained in previous studies.[2]* **7** *However, the modelled data were not consistent with these results for afternoon journeys.*	6 _____ 7 _____

8 *Although the mean CO concentrations modelled by TEMfor afternoon journeys on foot were in line with those of Figo et al., a striking difference was noted when each of the three peak hours was considered singly (Fig. 2).* **9** *It can be observed that during the first hour (H_1) of the peak period, journeys on foot resulted in a considerably lower level of CO exposure.* **10** *Although levels for journeys on foot generally exceeded those modelled for car journeys during H_2, during the last hour (H_3) the levels for journeys on foot were again frequently far lower than for car journeys.*	8_____ 9 _____ 10_____
11 *A quantitative analysis to determine modelling uncertainties was applied, based on the maximum deviation of the measured and calculated levels within the considered period.* **12** *Using this approach, the average uncertainty of the model prediction for this study slightly exceeds the 50% acceptability limit defined by Jiang.*[7] **13** *Nevertheless, these results suggest that data obtained using TEM to simulate CO exposures may provide more sensitive information for assessing the impact of traffic management strategies than traditional on-site measurement.*	11_____ 12_____ 13_____

3.3.2 关键

In Sentences 1 and 2 '*Data obtained in previous studies*[1,2] *using a fixed on-site monitor indicated that travel by car resulted in lower CO exposure than travel on foot. According to Figo et al. (1999), the median exposure of car passengers was 11% lower than for those walking.*[2]**' the writer refers to the findings and conclusions obtained by other researchers.**

为什么不先描述一下我的结果呢?

如果你首先描述个别结果，读者将需要通过将这些个别结果结合在 一起来构建你结果的整体方案或模式。这对读者来说是困难的；作

为作者，你的工作是安排信息，使读者能够轻松处理它。因此，和 所有小节一样，从一些介绍性材料开始会更“友好”于读者。当你在你的作品中开始任何新的章节或小节时，第一句（几句）应该为读者提供一个平滑的过渡，连接新的（子）章节和前一个章节。有 两种好的方法可以做到这一点：

1. **你可以通过提供当前部分的概述来开始。这是对结果整体模式或 趋势的描述。**如果你从单个结果开始，而你的读者将它们“自下而 上”地组合起来以创建对发生了什么的整体图景，那么每个读者可 能最终会对你的结果有不同的理解，因此存在风险。因此，最好从 关于发现的总体陈述开始（在大多数情况下，通常来说，总体上） 。提供概述使你能够在开始描述“砖块”之前向读者展示“墙”。 值得记住的是，当你从一组结果转到另一组结果时，这种类型的总 体概述可能需要重复。

2. 你可以开始回顾前面部分的内容。例如，你可以回顾：

- 该领域研究的一般目标（您在引言中提到的）
- 您关注的具体研究问题或您项目的目标（您在引言中提到的）
- 方法论
- 要测试的原始预测或假设（您在引言中提到的）
- 该领域其他研究的发现（您在引言中提到的）

为什么我应该在这里重新陈述我的具体研究问题或项目目标?

最终，在讨论中，您需要说明您的研究（特别是您的发现）在多大程度上解决了您在引言中设定的问题或实现了目标。因此，您的结 果应与您的目标密切相关；实际上，当您仔细审查您的结果时，您 甚至可能决定回到引言，并根据您获得的结果重新定义原始目标。

我为什么要在这里重述原始预测或其他研究的发现呢？

您的结果支持、修改或反驳原始预测，并且它们可能支持、修改或反驳其他研究者的发现。通过在本节开始时重复原始预测或其他研 究者的发现，您的读者可以更清楚地看到您的结果与该预测或那些 发现的关系。您的读者不会像您一样清晰地记住您论文的早期部分

。

In Sentences 3 and 4 '*In our study, modelled emission rates were obtained using the Traffic Emission Model (TEM), a CO-exposure modelling framework developed by Ka.[3] Modelled results were compared with actual roadside CO concentrations measured hourly at a fixed monitor.'* **the writer refers back to his/her own methodology and adds more information about it.**

你可能会决定在开头的句子中提到或总结你的研究方法。这样做的一个原因是突出你用来获得结果的材料、设备或方法中的重要方面。另一个原因是提醒读者你的研究方法。当然，你自己对它非常熟悉——毕竟，这是你自己的研究——但你的读者并不具备这种熟悉感。此外，方法的详细说明通常在这里给出，而不是在前一部分，后者可能只包含方法的基本框架。方法越具体、越复杂，这种情况就越可能发生。

背景信息在这里和其他地方一样常见且必要。在这种情况下，提供了用于获取结果的仪器或设备的信息（例如，*a CO-exposure modelling framework developed by Ka*[3]）。稍后在结果部分，你可能需要提供更多事实信息，以解释为何某个特定结果会发生。例如，某个结果可能是由于所用材料的某一特性或属性获得的，在这种情况下，你应当向读者提供关于该属性或特性的信息。像往常一样，提供略多一些的背景事实信息总比提供过少的要好。话题越广泛——因此读者群体也越广泛——你应提供的背景信息就越多，以便所有读者都能理解结果为何会如此。

In Sentence 5 '*Figure 1 shows the results obtained using TEM.*' **the writer invites the reader to look at a graph/figure/table *etc*.**

为什么我需要邀请读者去看呢？他们继续往下阅读页面时，肯定会看到图表。

当你在阅读时遇到这样的句子，你会怎么做？你会停下来看看图表;你会尝试理解它或解释你在其中看到的数据；然后你会回到文本 中，并在继续阅读时记住那个解释。如果图表中的数据非常清晰， 并且只有一种可能的解释，那么你邀请读者查看它的时机就无关紧 要。在这种情况下，结果非常清晰且易于解释，因此在你评论之前 让读者查看它是安全的。然而，许多图表、表格和照片中的数据可 以有多种解释，在这种情况下，你应该在邀请读者查看之前先对该 图表中的结果进行评论。如果不这样做，读者可能会与您的解释不同。

In Sentence 6 '*As can be seen, during morning peak-time journeys the CO concentrations for car passengers were significantly lower than for pedestrians, which is consistent with results obtained in previous studies.*[2]' **the writer refers to specific results and compares them with those obtained in another study, using subjective, evaluative language** (*consistent with*)**.**

我需要将我的结果与其他研究者的结果进行比较吗？

本书的一个目标是让你意识到，在你开始自己的研究之前，你所写 的文章与现在你想要写的文章之间的区别。到目前为止，你可能为像你的老师或教授这样的人写过报告，他们对你的研究主题了解得 比你多。你进行的实验或模拟已经被其他研究人员执行过，因此在 大多数情况下，结果是可预测的。你唯一的任务是向那些已经知道 你应该使用什么方法以及你将获得什么结果的读者描述你所使用的 方法和你获得的结果。

现在，情况发生了变化，除了报告你的结果外，你还应该在你 所在领域的"研究地图"上定位它们。这意味着你需要向读者展示 你的结果

如何以及在何处与现有研究图景相适应，因此你需要将你 的结果与文献中的结果进行比较。你将在讨论中更全面地展开对你 工作的“映射”，但为了有效地做到这一点，你需要首先将你的结 果与现有结果进行对比。

我应该以什么顺序呈现我的结果？

您向读者展示结果的顺序非常重要。您可能急于展示最重要的结果,但可能需要先描述那些基础或引导更重要结果的结果。

为什么我必须使用评价性语言——为什么不直接描述图表中的结果？

如前所述，结果本身并不会说明一切。在某些情况下，你不必使用评价性语言；有时，结果可以通过数字或非评价性语言客观呈现。然而，如果你只是描述图表中的内容，那么你并没有提供任何额外的信息，读者本可以自己看到这些内容——那为什么还要这样做呢？你对结果的评论会影响读者对它们的认知。正如我们之前在第3.2.3节中提到的，如果你写道“如图1所示，两个曲线非常相似”，读者会关注曲线之间的相似性；然而，如果你写道“*As can be seen in Fig. 1, the two curves are noticeably different*”，读者就会注意到它们之间的差异。

In Sentence 7 ‘*However, the modelled data were not consistent with parallel FOM measurements for afternoon journeys.*’ **the writer offers a general statement about his/her results to begin a new paragraph.**

在这句话中，作者正在转向更有趣、更具争议性的结果，并通 过开始一个新段落并在句子开头使用一个信号（*However*）来传达给读 者。作为一名作者，你总是知道哪些结果是有趣或重要的，但除非 你通过使用这样的信号将其传达给读者，否则所有结果将被视为具 有相同的功能和重要性。

In Sentence 8 '*Although the mean CO concentrations modelled by TEMfor afternoonjourneys onfoot were in line with those of Figo et al., a striking difference was noted when each of the three peak hours was considered individually (Fig. 2).'* **the writer refers to specific results and compares them to those obtained in another study, using language that comments on the result(s) (***a striking difference***).**

在某个阶段，您需要详细描述个别结果，选择重要、典型或特 别有趣的结果。

"striking"这样的词是不是被认为太非正式了?

绝对不是。在科学研究写作中，通常不会使用感叹号（!），即使你可能会觉得如果你的结果非常激动人心，使用感叹号会很合适。相反，科研写作使用各种词汇和短语来实现那种"哇！！"的感觉，包括"*striking*"（引人注目）。这些词汇的完整列表可以在讨论/结论部分的词汇表中找到（第4.4节）。

还要注意，通过以"Although"开头，作者帮助读者正确预测句子的功能。这个句子也可以这样写:

The mean CO concentrations modelled by TEMfor afternoonjourneys onfoot were in line with the FOM data **but** *a striking difference was noted when each of the three peak hours was considered singly.*

但是，读者必须等到句子的中间（*but*）才能发现句子前半部分信息的功能，并且可能需要"回头"再看句子的前半部分以便理解它 。当信号出现在句子的前面时，它们更有用。

In Sentences 9 and 10 '*It can be observed that during the first hour (H1) of the peak period, journeys on foot resulted in a considerably lower level of CO exposure. Although levels generally exceeded those modelled for car journeys during H2, during the last hour (H3) the levels for journeys on foot were again frequently far lower than for car journeys.*' **the writer selects specific results to describe in more detail, using language that comments on the results** (*considerably lower, generally, frequently far lower*)**.**

我应该解释我的结果并展示它们吗？

这取决于你结果的复杂性和你写作的论文类型。解释可以通过提供背景事实信息来说明为什么某个结果会发生，例如，提供你研究的材料的特性或你使用的方法类型的信息。确保你理解结果的*explanation*（为什么会这样发生）、结果的*evaluation*（数字意味着什么）和结果的*implication*（结果暗示或表明了什么）之间的区别。在这一阶段，你的解释应限于对结果的直接评论；你将在讨论/结论部分进一步展开更广泛的解释和含义。

我怎么知道应该详细描述哪些结果？为什么不详细描述所有结果呢？

如果你以相同的细节描述所有结果，它们看起来将具有相同的重要 性。这种情况不太可能发生：你的某些结果可能比其他结果更重要，有些是典型的，有些是关键结果，而其他结果可能更具边缘性。 然而，你的句子最终只是白纸上的黑线——读者无法听到你的声音,因此无法听到你强调某个特定结果的重要性。你不能用红色打印 它，正如我们所看到的，你甚至不能使用感叹号。因此，选择详细 描述特定结果向读者传达了你认为该特定结果是重要的，值得突出 或强调。

有趣的是，最佳结果通常以一种方式描述，以给人一种它们是典型结果的印象——在你阅读的论文中要注意这一点。这通常通过陈述一个概括，后面跟着 *for example*，然后是结果：“*...the SFS results are in very good agreement with their FE counterparts; for example, at midspan the values are almost identical*”，不要为说服的需要感到羞愧；如果你骄

傲或害羞地坚持使用“裸数字”对你的结果进行简单描述，读者可能会对你的结论感到惊讶，因为 你没有说明这些数字的含义。你的读者可能不同意你的观点，但他/ 她需要知道你对你的结果的看法。

> **In Sentence 11 ‘***A quantitative analysis to determine modelling uncertainties was applied, based on the maximum deviation of the measured and calculated levels within the considered period.’* **the writer refers to the method used to analyse the results.**

为什么这没有包含在方法论中?

如果你查看目标期刊中的结果部分，你会惊讶于这一部分包含的研究方法量。方法部分通常只涉及材料和方法的基本结构和组成。在这种情况下，大部分细节都会被纳入到结果部分。以这种方式呈现信息在科学期刊中变得越来越常见。

> **In Sentence 12** ‘*Based on this approach, the average uncertainty of the model prediction for this study slightly exceeds the 50% acceptability limit defined by Jiang.7*’ **the writer mentions a problem in the results and uses quantity language** *(slightly)* **to minimise its significance.**

我需要在结果中提到问题吗？这不会让读者怀疑我的结果吗?

如方法论中所讨论的，情况正好相反。除非您确定问题微不足道且 不可见，否则不要忽视结果中的问题。如果您的结果不完整或其中一些不“适合”，您应该提及这一点，如果可以的话，尽量降低其 重要性，并提出可能的问题原因/提供解决方案。未提及问题表明您 对其缺乏足够的专业知识，这对您的专业权威产生负面影响。相反 ,在您的工作中包含对问题的讨论恰恰相反：它表明您完全掌控您 的研究并能够清晰地评估它。此外，它为您提供了讨论/结论的一个 重要元素：未来研究的方向或建议。

与方法论中的问题一样，如果你拖延写作直到你的结果完美无 缺，你可能永远无法发表。因此，一旦你的结果值得沟通，就尽快 写出来；不要等待完美。在撰写结果部分时，提及并承认你在结果 中遇到

的问题或困难；在讨论未来工作的建议时，首次提及这些问 题是不合适的。

那么我如何在结果中讨论问题呢？

使用能够最小化问题、暗示可能原因并/或提供解决方案或前进方向的词汇。在上述示例中，作者承认存在问题，并略微最小化了其影响。你可以在第3.4节的词汇列表中找到需要参考的语言，用以描述不完美或有问题的结果。

> **In Sentence 13** '*Nevertheless, these results suggest that data obtained using TEM to simulate CO exposures may provide more sensitive information for assessing the impact of traffic management strategies than traditional on-site measurement.*' **the writer makes a reference to the implications and applications of the works/he has done.**

难道不应该等到讨论后再说吗？

对影响和应用的考察无疑是讨论的核心领域之一，但大多数作者在结果部分的末尾会对他们的结果意味着什么，即他们结果的含义， 给出一些指示。一旦个别结果被描述和讨论，论文或论文的重点就 开始展开，逐渐远离中心的"报告"部分，朝向结论。这种类型的 句子在这一点上非常常见，使用像 *suggest* 或 *indicate*这样的动词。

3.3.3 模型

这里是我们收集的句子描述：

In Sentences 1 and 2	**the writer refers to the findings and conclusions obtained by other researchers.**
In Sentences 3 and 4	**the writer refers back to his/her own methodology and adds more information about it.**
In Sentence 5	**the writer invites the reader to look at a graph/figure/table *etc.***
In Sentence 6	**the writer refers to specific results and compares them with those obtained in another study, using subjective, evaluative language.**
In Sentence 7	**the writer offers a general statement about his/her results to begin a new paragraph.**
In Sentence 8	**the writer refers to specific results and compares them to those obtained in another study, using language that comments on the result(s).**
In Sentences 9 and 10	**the writer selects specific results to describe in more detail, using language that comments on the results.**
In Sentence 11	**the writer refers to the method used to analyse the results.**
In Sentence 12	**the writer mentions a problem in the results and uses quantity language to minimise its significance.**
In Sentence 13	**the writer makes a reference to the implications and applications of the work s/he has done.**

我们可以简化这些，使我们的模型具有四个基本组成部分。与方法 论模型一样，这也是一个“菜单”，您可以从中选择适合您的研究 主题和您要提交的期刊的项目。

1	REVISITING THE RESEARCH AIM/EXISTING RESEARCH REVISITING/EXPANDING METHODOLOGY GENERAL OVERVIEW OF RESULTS

2	INVITATION TO VIEW RESULTS SPECIFIC/KEY RESULTS IN DETAIL, WITH OR WITHOUT EXPLANATIONS COMPARISONS WITH RESULTS IN OTHER RESEARCH COMPARISON/S WITH MODEL PREDICTIONS
3	PROBLEMS WITH RESULTS
4	POSSIBLE IMPLICATIONS OF RESULTS

3.3.4 测试模型

下一步是查看该模型在真实的结果部分中的工作方式，在您选择的 目标文章中，该部分（请记住，它可能被称为“分析”或“数据分 析”）的内容。以下是一些来自真实研究文章的完整结果部分。通 读它们，并在您认为看到模型组件（1 、2、 3或4）的地方标记出来 。例如，如果您认为第一句话对应于模型中的数字1，请在其旁边写 上1，依此类推。

Finite element modelling of sewer linings

4. NUMERICAL MODELLING

4.1. The finite element mesh

The cross-sectional geometries of the three egg-shaped linings are defined by the joining of two circles of differing diameters by slightly curved segments tangential to the circles. In the case of the St and Ch linings, the circles were osculating and with (275, 140 mm) and (330, 110 mm) radii, respectively; the Ce lining consisted of nonosculating circles of (250, 115 mm) radii, their nearest points from one another separated by a distance of

105 mm. Measurements were carried out on the cross-sections of the three lining types so as to determine the radii of curvature of the somewhat flat mid-section, a difficult task because of this flatness.

The thickness of the linings was found to vary along the cross-section; hence the mid-flat section tends to become slightly thicker than the rest of the cross-section. However, this is not accounted for in the model because it was observed that the thickness also varies along the length of the lining, and accurate measurements are not practically viable. So, a thickness of 6 mm is adopted for the St lining, 8 mm for the Ch, and a 10 mm thickness for the Ce lining. These thickness values are doubled at the hoop joints so as to simulate the actual junctions.

Due to symmetry about the vertical axis (*i.e.* the *y*-axis) of both loading and geometry, only half of the cross-section i

analysed (see Fig. 2). Moreover, because of symmetry about the *x*-*y* plane, only half of the total lining length is considered (see Fig. 3). The cross-section of the lining which is under study is situated at the *x*-*y* plane of symmetry, located at a distance equal to half the total length of the lining. The reason for restricting the calculation of the stresses and deflections to this cross-section, is that full experimental data was only obtained at this lining location [8].

The element used in the analysis is an eight-noded isoparametric thin-shell element [6] with six degrees of freedom (*i.e.* three displacements and three rotations) at each node. Bending and membrane stresses are calculated at nodal points of individual elements and are then averaged for nodes which are common to more than one element.

Finally, the mesh adopted consists of 180 elements subdivided into nine elements in the longitudinal direction and 20 elements in the hoop direction (see Figs. 2 and 3). The subdivision of elements in the hoop direction consists of six elements at the invert of the lining, six elements at the mid-flat section, and eight elements at the top section of the lining (Fig. 2). The same mesh was used in the analysis of all three linings.

In addition to imposing the relevant displacement and rotation constraints along the two planes of symmetry that allow only one-quarter of the lining assembly to be analysed, and full fixity at the end of the pipe (*i.e.* all displacements and rotations are set to zero there), the boundary conditions corresponding to the five restraint set-ups were readily simulated by reference to the nodes situated at the joint section. Thus, whereas both displacements in the plane of the cross-section and the rotation about the longitudinal axis were suppressed at all mid-section nodes for BCI , no constraint for any of the degrees of freedom at the joint was imposed in the case of BC5 (see Fig. 1). For the three intermediate restraint set-ups, displacements of those nodes in contact with the wooden segment(s) were suppressed. All analyses were carried out by reference to a value of (uniform) suction pressure equal to 1 kN m^{-2}, and subsequent results, therefore, should be viewed with this value in mind.

4.2. Stanton and Staveley lining

As mentioned earlier, a thickness value of 6 mm was adopted in the analysis of the St pipe, this becoming equal to 12 mm for the elements located at the joint section. The mid-length of the pipe encompassed by the FE mesh was 1200 mm, as measured from the end of the lining assembly to the central cross-section monitored during testing and presently under study.

Figures 4 and 5 show a comparison between the experimental values of inner (hoop) strains and (transverse) deflections [8], and the ones stemming from the FE analysis for all five boundary cases.

(These and subsequent results are plotted against the vertical distance from the crown right up to the invert.) Here, the material properties used in the numerical model were selected from the lower range of values listed earlier, as this gave rise to a better correlation between the experiments and the FE analysis. These material properties for the lining were chosen as follows: E_h = 11.5 kN mm^{-2}, E_l = 5.5 kN mm^{-2}, ν_h = 0.29 and ν_l = 0.14, where, in order to be consistent with Betti's condition, $\nu_l \cdot E_h = \nu_h \cdot E_l$, it was decided to adjust the value of Poisson's ratio by taking the lower range of ν_l (ν_l being considered, in general, a more reliable test value than ν_h) at 0.14, and then working out ν_h at 0.29, a sensible approximation, as argued elsewhere [8].

It is noticed from the results of the analysis that the hoop strains and deflections resulting from the FE model follow similar patterns to the ones recorded from the vacuum rig tests. Moreover, it can be seen from Table 1 (which includes the maximum percentage error between the experimental results and the analytical predictions) that the FE model predicts reasonably well the critical values of deflection at the mid-flat section of the lining for the five test cases. This was also true for the critical values of inner strain (occurring at the invert of the lining) for test cases 3 and 5; however, the predicted values of critical bending strain were lower than their experimental counterparts for test cases 1, 2 and 4. This suggests that the FE model tends to predict reasonably well the behaviour of the lining in the absence of restraint set-ups, as can be shown from Table 1 (*i.e.* small percentage error in

terms of critical strains and deflections for BC5). It will be shown later on that a more realistic simulation of the restraint set-ups can improve considerably the numerical predictions of the lining response.

4.3. Channeline lining

The half-length of the Ch pipe was 1170 mm and, again, its thickness (equal to 8 mm) was doubled for elements located at the joint section. Figures 6 and 7 show a comparison between the experimental results and the FE analysis using a lower range of values of isotropic material properties for reasons similar to those for the previous lining. These were chosen as follows: $E_h = E_l = 6.9$ kN mm^{-2} and $\nu_h = \nu_l = 0.33$.

Unlike the St pipeline, which was made up of one-piece linings, the Ch linings are two-piece segmental. As it is difficult to simulate realistically the behaviour of the longitudinal joint(s) in the case of segmental linings, the experimental results are still compared with the FE results using the mesh described earlier, even though such a mesh does not attempt to model the joint. From the outcome of this analysis, it can be shown that the response of the numerical model in terms of inner strains and deflections follows a similar pattern to that of the experimental results, as indicated in Figs. 6 and 7. At first sight, this would seem to imply that the longitudinal joint did in fact provide full shear and bending-moment continuity, so that the joint could be replaced by an equivalent continuous structure (*i.e.* stiffer than a hinge but well below fixity). This conclusion, however, need not follow since the shape of the bending-moment diagram is such that it changes sign in the vicinity of the longitudinal joint, so that, for this particular type of loading, the latter location is acted upon by relatively small bending action anyway. Therefore, on the basis of the bending strains, it is difficult to establish what the relative stiffness of the joint is, and it might seem reasonable to postulate a hinge (whether because of a flexible joint or simply due to the shape of the bending-moment diagram). On the other hand, it is shown from Table 1 that the numerical model predicts reasonably well the behaviour of the lining in terms of values of critical inner

strains, but that it is not so good in terms of values of critical deflections. This fact would now suggest that the presence of the straight longitudinal joint might approach the effect of a hinge, thus allowing a larger rotation at the springings, with associated deflections at the flat mid-section of the lining, which are bigger than those obtained by the continuous-joint model in which the point of contraflexure does not occur exactly at the springing locations.

4.4. Celtite lining

The half-length of the pipe was 1200 mm and its thickness 10 mm (20 mm at the joint section).

Similarly to the previous cases, Figs. 8 and 9 show a comparison between the experimental observations and the FE-analysis results. Once again, a lower range of values of material properties is used; these properties are: E_h = 13 kN mm^{-2}, E_l = 10 kN mm^{-2}, ν_h = 0.10 and ν_l = 0.13. (It should be noted that, while ν_h was not obtained experimentally, it has been derived from Betti's condition.)

It may be seen that the patterns of inner strains and deflections from the numerical analysis are similar to their experimental counterparts. Since the Ce linings were segmental, remarks as for the Ch linings maybe made regarding the straight longitudinal joint; namely, that, although the bending-moment diagram has a point of infection in the vicinity of the segmental joint, the larger percentage errors exhibited by both Channeline and Celtite linings, relative to the one-piece Stanton and Staveley lining, suggest that a line hinge maybe more appropriate than the assumption of full continuity. Table 1 shows that good predictions in terms of the value of critical inner strain have resulted for boundary case 1 only, whereas in terms of critical deflection, such a conclusion applies for boundary cases 3 and 5, but not for the other three cases.

As for the previous two lining types, a stiffer response has resulted from the model. In addition to the presence of longitudinal joints, one must also point out that the deflection values recorded for the Ce lining during the experiments were small, and hence

the error induced in the readings might have further affected their accuracy.

Observations of 2,4,6-trichlorophenol degradation by ozone

3. Results and discussion

3.1. Rate constants for the degradation of 2,4,6-TCP

In previous studies degradation rate constants have been established by undertaking ozonation experiments (Graham et al., 2003) in the presence of a reference compound (Xiong and Graham, 1992a). The theoretical basis for this is as follows. The reaction of ozone with a solute M may be described by the following reaction scheme:

$$M + nO_3 \rightarrow \text{Moxid} \quad (1)$$

where n is the stoichiometric factor for the number of ozone molecules consumed per molecule of M degraded. The stoichiometric factor for many organic substrates has been reported to vary in the range of 1–5 (Hoigne and Bader, 1983b), and values of 1 (Davis *et al*., 1995) and 2 (Javier Benitez *etal*., 2000a) have been proposed for 2,4,6-TCP. In practice it is usually assumed that the ozone reaction is first order with respect to ozone and solute M concentration, thus the rate law can be formulated as

$$-d[M]/dt = kM[O_3][M] \quad (2)$$

where kM is the rate constant for the degradation of solute M by O_3. Previous work by the authors (Chu and Wong, 2003) has confirmed that under conditions where the ozone concentration can be considered constant, the degradation of 2,4,6-TCP is first order with respect to its concentration. In this study, in order to determine the degradation rate constant kM, ozonation has been conducted with a mixture of a solute M1 (2,4,6-TCP) and a reference compound M2 having a known rate constant (kM2). According to Eq. (2), it can be shown that

$$- d[M_1]/dt = kM_1\ [O_3]\ [M_1] \quad (3)$$

$$- d[M_2]/dt = kM_2\ [O_3]\ [M_2] \quad (4)$$

Dividing Eq. (3) by (4), gives

$$\frac{d[M_1]}{d[M_2]} = \frac{kM_1\ [M_1]}{kM_2\ [M_2]} \quad (5)$$

Integration of Eq. (5) yields

$$\text{Ln}\ \frac{[M_1]_0}{[M_1]_1} = \frac{kM_1}{kM_2} \quad \text{Ln}\ \frac{[M_2]_0}{[M_2]_t} \quad (6)$$

Thus, a graph of $\text{Ln}\{[M_1]_0/[M_1]\}$ versus $\text{Ln}\{[M_2]_0/[M_2]\}$ yields a line whose gradient gives (kM_1/kM_2). Since the rate constant (kM_2) of M_2 is known, the value of kM_1 can be determined.

In these tests, the reference compound that was chosen was the herbicide atrazine (2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine) since rate constants for this had been determined previously under the same conditions (Xiong and Graham, 1992a). Figure 1 shows the results of the ozonation tests in terms of the comparative degradation of 2,4,6-TCP and atrazine.

The calculated values for the rate constants for 2,4,6-TCP are shown in Table 1.

3.2. Reaction mechanism and dechlorination of 2,4,6-TCP

The rate constants shown in Table 1 indicate that the reactivity of 2,4,6-TCP is much greater at neutral pH than at low pH; this can also be seen in Fig. 2. This is partly explained by the much lower reactivity of undissociated 2,4,6-TCP with molecular ozone than in its substantially dissociated state at pH 7.5, and partly by the effect of hydroxyl radical-reactions at the higher pH. The latter effect is predominant at high pH and a previous study has shown a linear increase in pseudo first-order reaction rates with pH in the range of $7 < pH < 11$ (Chu and Wong, 2003). The results shown in Fig. 2 indicate that in the early stages of the reaction there is a large overall O_3:TCP reaction stoichiometry, thus, at a reaction time of 2 min, the stoichiometry is 89 and 47 mol O_3/mol TCP at pH 2 and 7.5, respectively.

An indication of the reaction mechanism during the ozonation of TCP is given by the extent of dechlorination. Recent studies (Han *et al*., 1998; Chu and Wong, 2003) have suggested one specific mechanism whereby a hydroxyl group replaces one chlorine atom to form 2,6-dichloro-benzo-1,4-quinone (DCQ), as indicated in Fig. 3. From this it can be seen that the reaction leads to a reduction in solution pH through the formation of HCl. To investigate this, the ozonation of TCP at various initial pH levels was carried out without the use of a pH buffer and the results are summarized in Fig. 4. Evidence of significant proton generation was observed, and the rate of pH reduction increased with the initial pH of the solution. In the reaction scheme shown in Fig. 3, only one chlorine in the TCP is substituted by a hydroxyl group to produce DCQ, H^+ and Cl-. However, it is likely that further dechlorination of the remaining two chlorine atoms is possible under favourable conditions, such as at high pH where substantial hydroxyl radical generation occurs. It can be seen from Fig. 4 that for the ozone reaction at the initial pH of 8.17 the change in the solution pH suggested a proton generation equivalent to approximately 1 mM, which is stoichiometrically close to the total chlorine mass of the original TCP (0.88 mM). However, it should be noted that DCQ can be further degraded by cleavage of the aromatic ring leading to the formation of aliphatic products. These in turn may react with ozone to form organic acids, such as formic acid and acetic glycolic acids (Abe and Tanaka, 1997), thereby reducing the solution pH.

Direct measurements of chloride concentration were made during the buffered ozone tests and these are shown in Fig. 5. It can be seen that the degradation of TCP (each molecule having three chlorine atoms) generates significant chloride ions as one of the major products. The number of chloride ions released during the TCP degradation was found to range between 1.5 and 1.9 per degraded molecule of TCP, with the number in this range systematically increasing with the extent of TCP degraded. Since this is an average value for the reaction, it indicates that dechlorination is a major reaction mechanism and suggests that for a proportion of the TCP molecules there maybe complete dechlorination.

Since it is speculated that at pH 7.5 a major part of the TCP reaction is via hydroxyl radical attack, it was thought that the generation of OH radicals may be limited in the presence of the carbonate buffer. To enhance the concentration of radicals the tests were repeated in the presence of hydrogen peroxide (H_2O_2/ HO_2^- is a promoter of radical-type chain reactions) and the comparative results can be seen in Fig. 5. The concentration of hydrogen peroxide (15 mM) used in this case corresponded to a final H_2O_2:O_3 mass ratio of 0.8 g/g. It can be observed from Fig. 5 that there was only a very small enhancement (~5%) of TCP degradation when H_2O_2 was present during the ozonation. A similar effect was observed with a lower H_2O_2 concentration (7.5 mM) indicating that H_2O_2 concentration was not a sensitive factor. In contrast, there was a much greater production of chloride, with the number of chloride ions released during the TCP degradation ranging between 1.7 and 2.7 per degraded molecule of TCP, with the number in this range systematically increasing with the extent of TCP degraded. This considerably higher productivity of chloride ions, without a proportional increase in TCP degradation, suggests that the O_3/ H_2O_2 oxidising conditions are able to readily release chloride from intermediate compounds formed from the TCP degradation. It is assumed that the reaction with intermediate compounds is principally through OH· radicals, but direct H_2O_2 oxidation may also occur.

3.3. Degradation of TCP with humic acid

Humic substances (*e.g.* humic acid) are typically present in significant quantities (2–20 mg/l) in natural, and wastewaters. They have been shown to have a complex behaviour in ozone reactions in that they can act as initiators, promoters and scavengers of hydroxyl radicals, as well as being a substrate for molecular ozone reactions. Previous studies (*e.g.* with atrazine; Xiong and Graham, 1992b) have shown that relatively low concentrations of humic substances can substantially enhance the degradation of organic substrates, while higher concentrations can greatly reduce the degradation. A similar approach was used in this study in which the rate of degradation of 2,4,6-TCP was determined in the

presence of different concentrations of HA. The results are shown in Fig. 6(a) and the TCP degradation curves were found to fit a pseudo-first-order model (R2 = 0.997–0.999); the pseudo-first-order rate constants are shown in Table 2.

It can be seen in Table 2 that the peak degradation rate occurred in the presence of approximately 17 mg/l (as TOC) of HA, corresponding to a HA:TCP mass ratio of 0.43. The maximum increase in degradation rate is approximately 25% (cf. in the absence of HA). At a HA concentration of 56.1 mg/l, and presumably higher concentrations, the degradation rate decreased relative to that in the absence of HA. In comparison, Xiong and Graham (1992b) found that the optimal degradation of atrazine occurred at a mass ratio of humic substances (as DOC)-to-atrazine of 1.8. However, since only part of the humic substances would be HA, the corresponding HA:atrazine ratio would be lower, and therefore closer to the values shown in Table 2. A further comparison can be made between the enhanced TCP degradation caused by the presence of HA with that caused by hydrogen peroxide. Fig. 6(b) compares the TCP degradation rates for the optimal HA concentration (16.8 mg/l TOC) with 516 mg/l of H_2O_2 (≡ 15 mM; H_2O_2:O_3 final mass ratio of 0.8 g/g). If it can be assumed that the enhanced degradation rates in both cases is the result of increased OH· radical production, then it appears that the HA was more effective than the hydrogen peroxide.

An examination of the relationship between flowering times and temperature at the national scale using long-term phenological records from the UK

Results

Mean dates and standard deviations of dates, together with extreme early and late dates for all species, are shown in Table 1. It is apparent, and was noted by Jeffree (1960), that there is a bias towards extreme lateness for early-season species, which is less obvious, or even reversed, in later species. This is demonstrated in Fig. 2, where the 11 species for which 58 years of data are available

are presented as box plots. The vertical dashed line represents the standardised mean of 0 days and asterisks represent extreme years. It is apparent that the species at the bottom of the figure (the earliest species) have more extreme late years and those at the top (the late species) have more extreme early years.

A summary of the stepwise regression models is given in Table 2. All but 1 of the 25 models was highly significant ($P < 0.001$). In general, coefficients for months close to the mean flowering date were negative, indicating that warmer temperatures promoted earlier flowering. At the same time, autumn coefficients were generally smaller and positive, indicating that some vernalisation requirement was necessary but also that the autumn influence was smaller than that of spring. Whilst the high number of comparisons suggests that some model terms would be included by chance alone, only the model for the autumn crocus looks peculiar, with a strong, positive influence of the previous autumn. The result of summing all of the regression coefficients together (see Table 2) suggests a response to warming of 2–10 days per 。C, the greatest response being shown by the "midseason" species. Only the autumn crocus produces a positive response, suggesting that the remaining species would all flower earlier, sometimes substantially so, under climate warming.

Figure 3 shows the response of all 25 events to the single monthly CET to which they are most closely correlated. Although most regression models included multiple terms, the temperature for a single month is used for simplicity because display against several months simultaneously is not straightforward. Also in Fig. 3, the response of the autumn crocus to the June CET is shown, confirming that a negative response to summer temperature does exist, albeit apparently overwhelmed by the effect of the previous autumn. Finally, in Fig. 3, horse-chestnut flowering times are shown in relation to the mean March–May CET. A comparison with the simpler relationship with the April CET confirms that relationships are tighter when the temperatures of many months are considered together.

现在在你的目标文章中做同样的事情。我们希望你能获得模型的良 好确认，并能回答本节开头的三个问题：

- 我该如何开始这一部分？我应该以什么类型的句子开头？
- 这个部分应该包含什么类型的信息，顺序是什么？
- 如何结束这一部分？

3.4 词汇

为了完成您需要撰写论文这一部分的信息，您现在需要为模型的每 个部分找到合适的词汇。本节中的词汇来自600多篇不同领域的研究 文章，这些文章均由母语者撰写并发表在科学期刊上。仅包含频繁出现的单词/短语；这意味着词汇表中包含的单词和短语被作者和编 辑都视为正常和可接受的。

在下一节中，我们将研究模型的以下七个领域的词汇：

1. 重新审视研究目标/现有研究

这包括提醒读者之前所说内容的方法。你应该对此进行提示（*As mentioned earlier,*）然后使用你最初使用的相同词语或短语——可能是在引言 中——为读者创造一个“回声”。

2. 结果概述

这包括介绍结果的一般模式或趋势的方法，以便读者知道该期待什 么。像“在大多数情况下”这样的短语在这里很常见。

3. 邀请查看结果

您不能总是写*Figure 1 shows…*图表和表格并不总是展示事物；有时它们 呈现事物或总结事物。

4. 具体/关键结果详述

用于描述特定结果的语言包括提供结果客观描述的语言（*lower*）和 主观的、评估性的语言（*significantly lower/slightly lower*）。

5. 与其他研究结果的比较

这包括您可能需要的语言，以便将您的结果与其他研究人员的结果 进行比较，使用他们的结果来确认/支持您的结果，并将您的结果与预测、模型或模拟进行比较。像“*is in line with*”和“*correlate well with*关”这 样的短语在这里很常见。

6. 结果的问题

请记住，研究并不一定因不恰当的结果而失效，只要这些结果以传统、专业的方式呈现。诸如*minor deficit* and *not within the scope of this study* 等短语将在这里帮助您。

7. 结果的可能影响

关于您的结果意味着什么的建议是论文中的一个关键点，并标志着 向讨论/结论的过渡。诸如“*This indicated/suggested/implied that*”以及“*It seems therefore that*” 这样的短语在这里很有用；如果您想降低风险和责任，可以添加一 些限定性语言作为“减弱者”。

3.4.1 词汇任务

查看本单元和每篇目标文章中的结果部分。划线或突出显示您认为可以在上述七个领域中使用的所有单词和短语。

在以下页面中可以找到有用语言的完整列表。这包括您在本单 元的结果部分中突出显示的所有单词和短语，以及您可能在目标文 章中看到的一些其他常见词汇。在每个列表下方，您将找到它们的使用示

例。浏览列表并在字典中查找您不认识的任何词汇的含义。 这个列表在许多年里都将是有用的。

3.4.2 结果部分的词汇

1. 重新审视研究目标/现有研究

as discussed previously,
as mentioned earlier/before,
as outlined in the introduction,
as reported,
in order to … , we examined …
it is important to reiterate that …
it is known from the literature that …
it was predicted that …
our aim/purpose/intention was to …
since/because … , we investigated …
the aforementioned theory/aim/prediction etc.
to investigate…, we needed to …
we reasoned/predicted that …

以下是这些如何使用的一些示例：

- **Since** the angular alignment is critical, the effect of an error in orientation was **investigated experimentally.**
- **We reasoned that** an interaction in one network between proteins that are far apart in the other network may be a technology-specific artifact.
- **In earlier studies** attempts were made to establish degradation rate constants by undertaking ozonation experiments.
- **The main purpose of this work** was to test algorithm performance.
- **As mentioned previously, the aim of** the tests was to construct a continuous crack propagation history.
- **In this work, we sought to** establish a methodology for the synthesis of a benzoxazine skeleton.
- **It was suggested in the Introduction** that the effective stress paths may be used to define local bounding surfaces.

结果概述

generally speaking, in general, in most/all cases, in the main, in this section, we compare/evaluate/present… it is apparent that in all/most/the majority of cases, it is evident from the results that… on the whole the overall response was… the results are divided into two parts as follows: using the method described above, we obtained…

以下是这些如何使用的一些示例：

- **It is apparent that both** films exhibit typical mesoporous structures.
- **It is evident** that these results are in good agreement with their FE counterparts.
- **In general,** coefficients for months close to the mean flowering data were negative.
- Our confidence scores have an **overall** strong concordance with previous predictions
- **On the whole,** the strains and deflections recorded from the FE model follow similar patterns to those recorded from the vacuum rig tests.
- Levels of weight loss were similar **in all cases.**

查看结果的邀请

(data not shown) (Fig. 1) (see also Fig. 1) (see Fig. 1) (see Figs. 1–3) according to Fig. 1 as can be seen from/in* Fig.1	Figure 1: contains corresponds (to) demonstrates displays gives illustrates lists

as detailed in Fig.1 as evident from/in the figure as illustrated by Fig. 1 as indicated in. Fig.1 as listed in Fig.1 as shown in Fig.1 as we can see from/in Fig.1… can be found in Fig.1 can be identified from/in Fig.1 can be observed in Fig. 1 can be seen from/in Figure 1 comparing Figs. 1 and 4 shows that… data in Fig. 1 suggest that… displayed in Fig. 1 evidence for this is in Fig. 1 from Fig. 1 it can be seen that… inspection of Fig. 1 indicates... is/are given in Fig.1 is/are represented (*etc.*) in is/are visible in Fig. 1 in Fig. 1 we compare/present etc…. results are given in Fig.1 we observe from Fig. 1 that…	plots presents provides reports represents reveals shows summarises

**from* means 'can be deduced/concluded from' the figure/table whereas *in* means that it actually 'appears in' the figure/table

以下是一些使用这些表达的例子：

- 图 18 中的应力数据表明了一种更合理的关系。
- 图 3 展示了空间时间活动建模的结果。
- 图 6(d) 中报告了总体体积变化。
- 在将 GzmA 加载到细胞中后得到了类似的结果（数据未显示）。
- 可以在图 1 中看到典型的循环伏安图。
- 比较图 1 和图 4 显示，在孔隙压力消散后，体积应变产生。

• 表 1 中显示的速率常数表明，在中性 pH 条件下反应性大大增强。

• 结果总结在表 4 中。

具体/关键结果详述

当你查看目标文章时，你会注意到，找到用于提供结果*objective description*的语言示例比找到用于提供结果*subjective description*的语言示例要困难得多，并且当它确实出现时，客观语言很可能会被主观的“附加内容”所修饰。例如，像*slightly lower*或*much lower*这样的短语出现的频率远高于单独使用*lower*这个词。这是因为，如前所述，结果的客观描述并没有告 诉读者他们从图表中看到的内容以外的任何信息。

如果你在区分*objective*语言和*subjective*语言方面遇到困难，请记住，将一个水平或数量描述为*higher*于另一个是客观真理；将一个水平或数量描述为*high*是主观评估。

(i) 目标描述

accelerate(d) all change(d) decline(d) decrease(d) delay(ed) drop(ped) exist(ed) expand(ed) fall/fell find/ found increase(d)	is/are/was/were constant is/are/was/were different is/are/was/were equal is/are/was/were found is/are/was/were higher is/are/was/were highest is/are/was/were identical is/are/was/were lower is/are/was/were present is/are/was/were seen is/are/was/were unaffected is/are/was/were unchanged is/are/was/were uniform	match(ed) none occur(red) peak(ed) precede(d) produce(d) reduce(d) remain(ed) constant remained the same rise/rose sole/ly vary/varied

百分比、水平、位置、数量等的数值表示，例如 2% 的增加，当然也是“客观的”。

以下是一些使用这些表达的例子：

- There was a **lower** proportion of large particles present at lower pH.
- As can be seen in Fig. 8, there were **different** horizontal and vertical directional pseudofunctions.
- As can be seen, in the second trial the level of switching among uninformed travellers **was unchanged**.
- This kind of delamination **did not occur** anywhere else.
- The CTOA **dropped** from its initial high value to a constant angle of 4º.
- It eventually **levelled off** at a terminal velocity of 300 m/s.

(ii) 主观描述

abundant(ly)	imperceptible(ibly)	remarkable(ably)
acceptable(ably)	important(ly)	resembling
adequate(ly)	in particular,	satisfactory
almost	in principle	scarce(ly)
appreciable(ably)	inadequate	serious(ly)
appropriate(ly)	interesting(ly),	severe(ly)
brief/(ly)	it appears that	sharp(ly)
clear(ly)	large(ly)	significant(ly)
comparable (ably)	likelihood	similar
considerable(ably)	low	simple(ply)
consistent(ly)	main(ly)	smooth(ly)
distinct(ly)	marked(ly)	somewhat
dominant(ly)	measurable(ably)	steep(ly)
dramatic(ally)	mild(ly)	striking(ly)
drastic(ally)	minimal(ly)	strong(ly)
equivalent	more or less	substantial(ly)
essential(ly)	most(ly)	sudden(ly)
excellent	negligible(ibly)	sufficient(ly)
excessive(ly)	noticeable(ably)	suitable(ably)
exceptional(ly)	obvious(ly)	surprising(ly)
extensive(ly)	only	tendency
extreme(ly)	overwhelming(ly)	the majority of
fair(ly)	poor(ly)	too + adjective
few		unexpected(ly)

general(ly) good high(ly) immense(ly)	powerful(ly) quick(ly) radical(ly) rapid(ly)	unusual(ly) valuable very virtual(ly)

加上频率和数量列表中的所有其他语言（第 3.2.2 和 3.2.3 节）。

以下是一些如何使用这些语言的示例（*including examples from the* ***frequency*** *and* ***quantity*** *lists****）：***

- In **the majority of** cases, SEM analysis revealed a **considerably** higher percentage of fine material.
- As can be seen, the higher injection rate gave **satisfactory** results from all three methods.
- **Similar** behaviour was observed in all cases, with no **sudden** changes.
- It can be seen in Fig. 5 that the Kalman filter gives an **excellent** estimate of the heat released.
- The effect on the relative performance was **dramatic**.
- A **striking** illustration of this can be seen in Fig. 5.
- Comparing Figs. 4 and 5, it is obvious that a **significant** improvement was obtained in **the majority of** cases.
- It can be observed from Fig. 5 that the patterns are **essentially** the same in both cases.
- Figure 1 shows a **fairly** consistent material.
- It can be observed from Fig. 2 that there was **only** a **very small** enhancement when H_2O_2 was present.

与其他结果的比较

如果您引用其他研究，请确保参考文献的引用位置或编号准确，否则其他研究人员可能会“拥有”您的工作。请记住，研究引用的正 确位置不一定是在句子的末尾。

as anticipated as expected, as predicted by… as reported by… compare well with concur confirm consistent with contrary to corroborate correlate disprove inconsistent with in line with	is/are better than is/are in good agreement is/are identical (to) is/are not dissimilar (to) is/are parallel (to) is/are similar (to) is/are unlike match prove refute reinforce support validate verify

许多这些可以通过添加表达式来修改，以匹配您想要表达的确定性 水平，例如：

It seems that
It appears that
It is likely that

（有关更多内容，请参见第3.2.4节。）

以下是这些如何使用的一些示例：

- **It is evident that** the SFS results obtained here are **in** exceptionally **good agreement with** existing FE results.
- Distributions are **almost identical** in both cases.
- Our concordance scores **strongly confirm** previous predictions.
- We see that the numerical model tends to give predictions that **are parallel to** the experimental data from corresponding tests.
- These results demonstrate that improved **correlation** with the experimental results was achieved using the new mesh.
- This is **consistent** with results obtained in [1].
- The results are qualitatively **similar** to those of earlier simulation studies.
- These trends are **inline with** the previously discussed structure ofthe of the ferrihydrite aggregates.

结果问题

请记住，研究并不一定因不恰当的结果而失效，只要这些结果以传 统、专业的方式呈现。下面的词汇将帮助您实现这一点。

minimise the problem/focus on good results	**suggest reasons for the problem**
(a) preliminary attempt	may/could/might have been
despite this,	*or*
however,	was/were:
immaterial	beyond the scope of this study
incomplete	caused by
infinitesimal	difficult to (simulate)
insignificant	due to
less than ideal	hard to (control)
less than perfect	inevitable
(a) minor deficit/limitation	it should be noted that …
negligible	not attempted
nevertheless	not examined
not always reliable	not explored in this study
not always accurate	not investigated
not ideal	not the focus of this paper
not identical	not within the scope of this study
not completely clear	possible source(s) of error
not perfect	unavoidable
not precise	unexpected
not significant	unfortunately
of no consequence	unpredictable
of no/little significance	unworkable
only	unavailable
reasonable results were obtained	

room for improvement	**offer a solution**
slightly (disappointing)	further work is planned
(a) slight mismatch/limitation	future work should … *
somewhat (problematic)	future work will … *
(a) technicality	in future, care should be taken
unimportant	in future, it is advised that …

* 请记住，短语“未来工作应该”用于为研究社区建议一个方向，而“未来工作将”则告诉读者这是您的下一个项目。

以下是这些如何使用的一些示例：

- The correlation between the two methods was **somewhat** less in the case of a central concentrated point load.
- **It should, however, be noted that** in FE methods, the degree of mesh refinement may affect the results.
- **Nevertheless**, this effect is **only** local.
- Full experimental data was **only** obtained at one location.
- **Reasonable results were obtained** in the first case, and good results in the second.
- **It is difficult to** simulate the behaviour of the joints realistically.
- **Although** this was **not** obtained experimentally, it can be assumed to exist.
- **Future work should** therefore include numerical diffusion effects in the calculation of permeability.
- This type of control saturation is fairly common and therefore **of no significance**.

这里有一个有趣的表格。它应该是搞笑的，但正如你所看到的，它反映了一组共同的假设和一种在研究社区中使用的“代码”。

WHEN YOU WRITE THIS …	DO YOU MEAN THIS?
It has long been known that…	I can’t remember the reference
This is of great theoretical and practical importance	This is interesting to me

It has not been possible to provide definite answers to these questions	The experiments didn't work out
High purity/very high purity/ extremely high purity	Composition unknown
Three of the samples were chosen for detailed study	The results of the others didn't make sense, so we ignored them
Typical results are shown	Only the best results are shown
Although some detail has been lost in reproduction, it appears to be clear from the original micro-graph that…	It is impossible to tell much from the original micrograph
Agreement with the predicted curve was: perfect excellent good reasonably good satisfactory fair not perfect as good as can be expected	Agreement with the predicted curve was: good fair poor very poor awful really awful imaginary non-existent
These results will be reported at a later date	I might get round to this sometime if I don't change careers
It is suggested that … It is believed that … It seems that…	I think that…

It is clear that much additional work is required before a complete understanding can be reached	I don't understand it
Unfortunately, a quantitative theory to account for these effects has not yet been formulated	Neither does anyone else
Correct within an order of magnitude	Wrong
It is hoped that this work will stimulate further research	This paper isn't very good, but neither is anyone else's
It is obvious	… but impossible to prove

结果的可能影响

在结果的某个阶段（通常是后期），提供对您的结果可能意味着什么的一般解释或解读是合适的。这通常是论文中的关键点，并标志着向讨论/结论的过渡。

仔细选择你的动词时态。你可以使用一般现在时或一般过去时。因为一般现在时是用来表达永久真理和事实的时态，使用一般现 在时将使你的句子具有事实的地位。因此，使用一般现在时"解锁 "了你从研究中得出的解释，并增强了其真实性（*We found that x occurs, which indicate/suggests that y causes z*）。如果你不太自信，可以使用一般过去时（*We found that x occurred, which indicated/ suggested that y caused z*）。

注意在这里找到的描述因果关系的词汇列表中有多少个单词(见第3.2.4节）。

apparently could* be due to could* be explained by could* account for could* be attributed to could* be interpreted as could* be seen as evidently imply/implies that indicate/indicating that in some circumstances is owing to is/are associated with is/are likely is/are linked to is/are related to it appears that it could* be concluded that … it could* be inferred that it could* be speculated that it could* be assumed that it is conceivable that it is evident that	it is logical that it is thought/believed that it seems that it seems plausible (*etc.*) that likely may/might means that perhaps possibly/possibility potentially presumably probably provide compelling evidence seem to suggest(ing) that support the idea that tend to tendency unlikely there is evidence for we could* infer that we have confidence that would seem to suggest/indicate

*可以用may或might或有时can替换；下一单元有关于这些情态动词的语法部分。

以下是这些如何使用的一些示例：

- **This suggests that** silicon is intrinsically involved in the precipitation mechanism.
- These curves **indicate that** the effective breadth is a minimum at the point of application of the load.
- Empirically, **it seems that** alignment is most sensitive to rotation in depth.
- Only the autumn crocus produced a positive response, **suggesting that** other species would flower earlier under climate warming.

- **It could be inferred** therefore that these **may have** reacted with ozone to form organic acids, such as formic acid.
- **This indicates that** no significant crystalline transformations occurred during sintering.
- **It is therefore speculated that** at pH 7.5 a major part of the reaction was via hydroxyl radical attack.
- **It is apparent that** this type of controller **may be** more sensitive to plant/model mismatch than was assumed in simulation studies.
- The results **seem to indicate that** this causes the behaviour to become extremely volatile.
- **It is evident that** the Ψ at midspan increases with the increasing *r*.

在你的母语中，你直观地选择恰好反映你主张的适当强度和你 在陈述时想要承担的风险水平的词汇和短语。你需要能够在英语中 做到这一点，无论是在这一部分还是在讨论/结论中。

We found that sunbathing causes cancer，这句话表达了一个非常强烈的主张，但你可以用许多不同的方式传达它的较弱形式。以下是一些例子：

We found that sunbathing ***is related to the onset of*** *cancer.*
We found that sunbathing ***was related to*** *the onset of cancer.*
We found that sunbathing ***may have been related to*** *the onset of cancer.*
We found ***evidence to suggest that*** *sunbathing may have been related to the onset of cancer.*
We found evidence to suggest that in ***some cases/in many cases****, sunbathing may have been related to the onset of cancer.*
We found evidence to suggest that in some cases, ***excessive*** *sunbathing may have been related to the onset of* ***certain types of*** *cancer.*
It is thought that *excessive sunbathing may* ***sometimes be considered as contributing to*** *the onset of certain types of cancer.*

3.5 撰写结果部分

在下一个任务中，您将汇集并使用本单元中的所有信息。您将根据 模型撰写结果部分，使用您所学的语法和词汇，因此请确保您面前有模型（第3.3.3节）和词汇（第3.4节）。

在本单元中，您已经看到传统的科研写作比直接从您自己的语 言翻译或更具创意的写作策略更容易学习、写作和让他人阅读。您 已经学习了结果部分的传统模型，并收集了常用的词汇。您的句型 也应该是传统的；使用您在目标文章和这里打印的结果中阅读过的 句子作为您写作中句型的模型，并根据任务进行调整。

这次请严格遵循模型。在你练习一两次之后，可以根据自己的 需要进行调整。然而，你应该始终使用它来检查你所写的结果部分 ,以确保信息的顺序合适，并且你在这一部分做了读者期望你做的 事情。
尽管在答案钥匙中提供了模型答案，但如果可能的话，您应该 尝试让英语母语者检查您自己的答案，以确保您正确使用了词汇。

3.5.1 编写结果部分

想象一下，您刚刚完成了一项研究项目，该项目调查了UFO（Unidentified Flying Object）目击与地震预测之间的可能联系。在本练习中，任务是评 估您的数据和发现，就像您在撰写研究论文的结果部分一样。

在你的引言中，你提到*various theories have been suggestedfor the increase in the number of UFO sightings immediately prior to an earthquake*。你声称，*it is possible that the increase in the number of sightings during the period immediately prior to an earthquake can be used to predict when an earthquake is likely to occur*。

在您的方法论中，您描述了如何收集数据并根据某些标准对其 进行评估。现在您将展示并评估这些数据在结果中。

使用下面的表1，撰写本文的结果部分。您研究论文的标题是《**The earthquake lights theory: an analysis of earthquake-related UFO sightings**》。您应该写大 约300-400字。如果您卡住了，不知道接下来该写什么，请使用模型 和词汇来帮助您继续前进。在完成写作之前，请不要查看模型答案 。像往常一样，您可以为这个练习编造事实和参考文献。

表1：距震中300公里内的UFO目击事件。

Country	UFO sightings for 7 days prior to earthquake	Earthquake magnitude	Average weekly UFO sightings	Description of UFO
Russia	55	3.2	11	Green ball of light
India	15	4.4	18	Fast-moving disc
Australia	120	6.0	30	White flashes of light
USA	275	5.6	75	Clusters of high-speed light
Canada	42	2.6	6	Blue-green egg-shaped object

3.5.2 关键

这是一个示例答案。当你阅读它时，思考每个句子中代表模型的哪 个部分。

Results

Based on the assumption that the timing of UFO sightings maybe of significance,2 the aim of this study was to investigate a possible link between the number of UFO sightings close to the epicentre during the period immediately prior to an earthquake, and the earthquakes that follow.

The process of evaluating UFO sightings is complex and time-consuming. Checks with police, air traffic control operators

Table 1: UFO sightings within 300 km of epicentre.

Country	UFO sightings for 7 days prior to the earthquake	Earthquake magnitude	Average weekly UFO sightings	Description of UFO
Russia	44	3.2	11	Green ball of light
India	15	4.4	18	Fast-moving disc
Australia	90	6.0	30	White flashes of light
USA	275	5.6	75	Clusters of high-speed light
Canada	48	3.6	6	Blue-green egg-shaped object

and meteorologists were performed. Where possible, witnesses were interviewed and videos of the area was examined in order to eliminate as many conventional explanations as possible, such as satellites, meteors, space debris and even bird flocks.[2,4,11] All the cases were documented using the procedure followed by Vader[4] and results are displayed in Table 1. The Richter scale[11] was used to measure magnitude.

It is evident from the results that overall, there was a marked increase in sightings during the seven days prior to the earthquake. These results are in line with those of Kenobi *et al*. (2004), who noted a mean fourfold increase worldwide.[9] In Russia and the USA, for example, the number of sightings increased approximately fourfold during the week preceding the earthquake, and in Canada the increase was even more dramatic. Although the number of sightings is low in Canada, this may have been due to a low national interest in UFOs; in addition, the earthquake took place in a sparsely-populated area of the country. It is significant that almost all the participants in each country gave exactly the same description of 'their' UFO, and that these descriptions were noticeably different from those obtained in other countries.

It appears from this evidence that the period immediately prior to earthquake activity was associated with an increase in the number of UFO sightings. However, this work represents only a preliminary attempt to establish such a link. The actual relationship between the two maybe more complex; for example, it is possible that because a Star Wars film was released in the USA during the period under study, the number of sightings was higher that week without any real change in UFO activity. These results nevertheless suggest that monitoring UFO activity may provide useful input for earthquake prediction strategies.

单元4 撰写讨论/结论

4.1 结构

该小节的标题因期刊而异。如第3单元所述，一些期刊以标题为“讨 论”的小节结束， 一些以标题为“结果与讨论”的小节结束，还有 一些以标题为“结论”的小节结束。在前两种情况下，讨论中需要 包含的元素是相似的。当有“结论”部分时，它通常较短，通常由 一到两个段落组成，专注于讨论的特定方面。

每个单元开头的图形表示是对称的，因为引言中的许多元素在 讨论/结论中（大致）以相反的顺序再次出现。引言从一般、广泛的 焦点转向论文的较窄“报告”部分，而讨论/结论则从那个狭窄的部 分转向更广泛、更一般的焦点。讨论基于中央报告部分的信息回顾 引言中提出的要点。

让我们再看一下引言的四个组成部分：

1	ESTABLISH THE IMPORTANCE OF YOUR FIELD PROVIDE BACKGROUND FACTS/INFORMATION (possibly from research) DEFINE THE TERMINOLOGY IN THE TITLE/KEYWORDS PRESENT THE PROBLEM AREA/CURRENT RESEARCH FOCUS

2	PREVIOUS AND/OR CURRENT RESEARCH AND CONTRIBUTIONS
3	LOCATE A GAP IN THE RESEARCH DESCRIBE THE PROBLEM YOU WILL ADDRESS PRESENT A PREDICTION TO BE TESTED
4	DESCRIBE THE PRESENT PAPER

当你开始引言时，你通过确立主题的重要性、提供背景信息等 方式，帮助读者进入研究文章。按照相反的模式，你在讨论/结论部 分结束时，帮助读者走出文章。

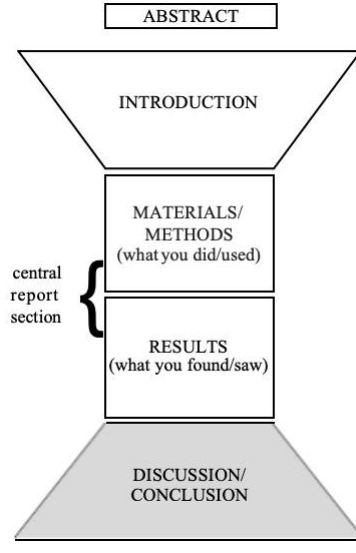


图 1. 研究文章或论文的结构。

在引言中，您写到了其他研究者的工作，为您的读者创建了一 种研究地图，以便他们能够看到该领域中存在的工作类型；在讨论/ 结论中，您将您的研究定位于该研究地图之中。接着，您在引言中 找到了研究中的空白或描述了与现有研究相关的问题；在讨论/结论 中，您需要说明您在多大程度上回应了该空白或解决了该问题。在 引言的最后，您写到了当前的论文，创建了与您自己工作的内容的 接口，以便将读者引导到您论文的核心报告部分；在讨论/结论中， 正如我们将看到的，通常会通过重新审视您工作的某个方面来开始 ,以便反向创建该接口，并使您能够远离核心报告部分。

所以如你所见，当我们来问我们的三个问题时：

- 我该如何开始讨论/结论部分？我应该以什么类型的句子开头？
- 此部分应包含什么类型的信息，以及其顺序如何？
- 如何结束这一部分？

尽管你可能认为自己不知道如何写讨论/结论，但实际上你对应该包 含什么以及顺序有很多了解。

请阅读下面的讨论/结论部分。论文的标题是：认知行为压力管理（CBSM）技能与压力相关障碍的生活质量。如果您对主题不熟悉或在理解某些单词时遇到困难，尤其是像认知行为这样的技术术语 ，请不要担心。在这个阶段，只需尝试获得一般理解，并熟悉所使 用的语言类型。

Cognitive-behavioural stress management (CBSM) skills and quality of life in stress-related disorders.

Discussion

1 *Prior work has documented the effectiveness of psychosocial intervention in improving quality of life (QoL) and reducing stress in patients suffering from various disorders; Epstein,*[18] *for example, reports that orthopedic patients participating in a two-week multimedia intervention programme improved across several QoL indices, including interpersonal conflict and mental health.* **2** *However, these studies have either been short-term studies or have not focused on patients whose disorder was stress-related.* **3** *In this study we tested the extent to which an extended three-month stress management programme improved QoL among a group of patients being treated for stress-related skin disorders such as eczema.*

4 *We found that in virtually all cases, participation in our three-month stress management programme was associated with substantial increases in the skills needed to improve QoL.* **5** *These findings extend those of Kaliom, confirming that a longer, more intensive period of stress-management training tends to produce more effective skills than when those skills are input over a shorter period via information transfer media such as leaflets and presentations (Kaliom et al., 2003).* **6** *In addition, the improvements noted in our study were unrelated to age, gender or ethnic background.* **7** *This study therefore indicates that the benefits gained from stress-management intervention may address QoL needs across a wide range of patients.* **8** *Most notably, this is the first study to our knowledge to investigate the effectiveness of extended psychosocial intervention in patients whose disorder is itself thought to be stress-related.* **9** *Our results provide compelling evidence for long-term involvement with such patients and suggest that this approach appears to be effective in counteracting stress that may exacerbate the disorder.* **10** *However, some limitations are worth noting.* **11** *Although our hypotheses were supported statistically, the sample was not reassessed once the programme was over.* **12** *Future work should therefore include follow-up work designed to evaluate whether the skills are retained in the long term and also whether they continue to be used to improve QoL.*

4.2 语法和写作技能

本节讨论了一个在讨论部分中重要的复杂语言领域：情态动词。

在科研写作中常用的情态动词包括 *may, might, could, can, should, ought to, need to, have to* 和 *must*。这里不讨论在正式科学 写作中不使用的情态动词，例如将 can 或 may 用于“许可”（例如： Can I borrow your pen?）。

情态动词常用于修改句子的“真值”。在这样的句子中：

The drop in pressure ***was*** *due to a crack in the pipe.*

没有情态动词——你在告诉读者是什么导致了压力的下降，并且你 有实证证据来证明这一点。然而，如果你写道：

The drop in pressure ***may have been*** *due to a crack in the pipe.*

你提供了压力下降的一个可能原因；perhaps it was due to a crack in the pipe — and perhaps not.如果你写

The drop in pressure ***must have been*** *due to a crack in the pipe.*

你是在说你几乎可以确定压力下降是由管道中的裂缝引起的，但实际上你没有证据证明这一点。确信某件事是真的和知道某件事是真的完全不同。例如，你不会看着手表说“肯定是十点”或者“我确信是十点”——你只会说“现在是十点”。当你没有戴手表时，你更可能说“肯定是十点”——换句话说，如果你不确定，或者缺乏实证证据。虽然使用情态动词“must”似乎让句子更有力度，但它也传达了缺乏证据的含义。

情态动词在“结果”和“讨论”部分尤其有用。在这些部分中，你正在写关于结果的原因、解释和意义，你通常需要传达某事是一个可能的

原因，或者一个显而易见的解释，或一个可能的含义。以下是一个典型的（结合的）“结果”和“讨论”部分的句子：

> *The kinetics **can** be described by these equations, suggesting that the electrons are transferred directly. This **might** involve a supercharge mechanism, but the data **could** also be described by electron transfer via a hopping mechanism.*

作为一个简短的练习，开始思考这些动词的使用方式，尝试将A栏中的情态动词与B栏中的含义匹配。大多数情态动词可以用于多种含义。

A	B
1. SHOULD 2. MUST 3. CAN 4. OUGHT TO 5. MAY 6. COULD	ABLE/CAPABLE He … go home by himself. *(He is able to go home by himself.)* _____ POSSIBLE/OPTIONAL He … go home. *(It is possible that he will go home.)* _____ PROBABLE/LIKELY He … be home soon. *(He will probably be home soon.)* _____ VIRTUALLY CERTAIN He … be at home. *(It is virtually certain that he is at home.)*

A	B

7. NEED TO 8. MIGHT 9. HAVE TO	ADVISABLE He… go home. *(I advise him to go home.)* _____ NECESSARY He … go home. *(It is necessaryfor him to go home.)*

现在请对照答案键检查你的答案：

CAN	ABLE/CAPABLE *(He can go home by himself.)*
MAY MIGHT COULD CAN	POSSIBLE/OPTIONAL *(He may/might/could/can be at home,)*
SHOULD OUGHT TO	PROBABLE/LIKELY *(He should/ought to be home soon.)*
MUST HAVE TO	VIRTUALLY CERTAIN *(He must/has to be at home.)*
SHOULD OUGHT TO	ADVISABLE *(He should/ought to go home.)*
MUST NEED TO HAVE TO	NECESSARY *(He must/needs to/has to go home.)*

有两个原因使这些动词难以使用。首先，正如你所看到的，一 些情态动词有多个含义。因此，当你使用像 *should*这样的动词时，确保你知道你是指某事可能会发生（或已经发生），还是指建议某事发生。

其次，大多数情态动词不遵循标准语法规则。有些消失，有些 在否定形式或不同的时态中改变其含义。例如，He must go home 的 意思与 He has to go home 相同，但 He must not go home 的意思是他不被允许回家，这与 He doesn't have to go home 的意思不同。

这里有一个表格，展示了这些情态动词在过去时和否定形式中 的用法，并附有例子。该表格并未涵盖每个情态动词的所有可能用 法。例如，情态动词may也用于请求许可（*May I borrow your pen?*），但在科学研究写作中你不太可能需要这个。由于本书的功能是帮助你撰写准确且可接受的研究文章，因此本节中的信息已限制为你 所需的内容。

1. 能力/能力

Present Simple	**CAN**	This software **can** distinguish between different viruses.
Present Simple negative	**CANNOT**	Until 18 months a child **cannot** use symbols to represent objects.
Past Simple	**COULD** **COULD HAVE**	It was found that the gun **could** shoot accurately even at 300 meters. If we had extended the time period we **could have** produced more crystals.
Past Simple negative	**COULD NOT** **COULD NOT HAVE**	1n 1990, 80% of households **could not** receive digital television. The subjects reported that they **could not have** fallen asleep without medication.

注意：

• The modal verb **can** only forms these two tenses when it refers t o ABILITY or CAPABILITY**.** If you need other tenses, you will need to switch to **be capable of** or **be able to**, *i.e. It is believed that this software* ***wi ll*** *eventually* ***be capable of*** *distinguishing between different viruses.*

• **could** means 'was generally capable of doing/able to do something i n the past', whereas **was able to** is used in relation to specific past events or past occasions, *i.e. The result suggests that in this case, the viruses* ***were a ble to*** *multiply freely.* If you're not sure whether to use **can** or **be able to,** use **be able to** — it's safer.

2. 可能性/选项

Present Simple	**MAY** **MIGHT** **COULD** **CAN**	A rubber seal **may/might/could/can** be useful at this location.
Present Simple negative	**MAY NOT** **MIGHT NOT** (but not **COULD NOT** or **CANNOT**)	A rubber seal **may not/might not** be useful at this location.
Past Simple	**MAY HAVE** **MIGHT HAVE** **COULD HAVE** (but not **CAN HAVE**)	The fall in pressure **may have been/might have been/could have been** caused by leakage.
Past Simple Negative	**MAY NOT HAVE** **MIGHT NOT HAVE** (but not **COULD NOT HAVE** or **CANNOT HAVE**)	The fall in pressure **may not have been/might not have been** caused by leakage.

注意：

- The word ‘well’ is sometimes added to communicate a stronger belief in the possibility: *This **may well** be due to leakage.*
- **might** is slightly weaker than **may**.
- Interestingly, **can not** and **cannot** don’t mean the same thing at all! **can not** means *possibly not* in the same way as **may not** or **might not**, but it is rarely used except in structures such as ‘this **can not** only damage the sample, it **may** even destroy it completely’. **cannot**, on the other hand, means something completely different: it doesn’t mean *possibly not*, it means *impossible*. **could not**, **cannot**, **could not have** and **cannot have** all fall in to this category. In sentences like:

*We realise that this **cannot** be due to a change in pressure.*

*We realised that this **could not** be due to a change in pressure.*

*We realise that this **cannot have been** due to a change in pressure.*

*We realised that this **could not have been** due to a change in pressure.*

The writer is not saying ‘possibly not’, s/he is saying ‘impossible’.

3. 概率/信念/期望

Present Simple	**SHOULD** **OUGHT TO**	The material **should** remain stable if it is kept below 30° C.
Present Simple negative	**SHOULD NOT** **OUGHT NOT TO**	The material **should not** decompose unless heated above 30° C.

Past Simple	**SHOULD HAVE** **OUGHT TO HAVE**	By the time the cobalt is added, the crystals **should have** dissolved.
Past Simple negative	**SHOULD NOT HAVE** **OUGHT NOT TO HAVE**	This was unexpected; the material **should not have** decomposed at this temperature.

注释：Although **ought to** means the same as **should**, it is less common i n science writing, so examples have not been given.

4. 虚拟确定性

Present Simple	**MUST** **HAVE TO**	Our results indicate that contamination **must** be due to the presence of sea water in the pipe.
Present Simple negative	**CANNOT**	It is clear that contamination **cannot/could not** be due to the presence of sea water in the pipe.
Past Simple	**MUST HAVE**	Our results indicate that contamination **must have been** due to the presence of sea water in the pipe.
Past Simple Negative	**CANNOT HAVE** **COULD NOT** **COULD NOT HAVE**	It was clear that contamination **could not be/ cannot have been/could not have been** due to the presence of sea water in the pipe.

注释：

- ‘virtual certainty’ modals communicate the fact that no other explanation is possible.
- **have to** is less common in science writing, so examples have not been given.
- **must not** means ‘not allowed/permitted’, it doesn’t mean ‘not possible’.

To separate Categories 2, 3 and 4, imagine that it normally takes Professor Windblast about 20 minutes to walk home from his laboratory. Has he arrived home yet? Well, you won’t know unless you call his house and speak to him, but

- if he left the lab 18 minutes ago, he **may/might/could** be home bynow *(possibly)*
- if he left 30 minutes ago, he **should/ought to** be home by now (*probably*)
- if he left 50 minutes ago, he **must** be home by now (*almost certainly*)
- if he left 5 minutes ago he **cannot** be home yet (*almost certainly not*)

5. 建议/意见

Present Simple	**SHOULD** **OUGHT TO**	The apparatus **should** be disconnected from the mains during repairs.
Present Simple negative	**SHOULD NOT** **OUGHT NOT TO**	This material **should not** be exposed to sunlight
Past Simple	**SHOULD HAVE** **OUGHT TO HAVE**	The apparatus **should have been** disconnected from the mains during repairs.

Past Simple Negative	**SHOULD NOT HAVE** **OUGHT NOT TO HAVE**	This material **should not have been** exposed to sunlight

注意:

• Although **ought to** means the same as **should**, it is less common i n science writing, and that is why examples have not been given.

• **should have /ought to have** usually refer to something that didn't occu r and **should not have/ought not to have** usually refer to something that did.

6. 必要性/义务

Present Simple	**MUST** **NEED TO** **HAVE TO**	The apparatus **must/needs to/ has to** be disconnected from the mains during repairs.
Present Simple negative	**NEED NOT** **DO NOT NEED TO** **DO NOT HAVE TO**	The apparatus **need not/does not need to/does not have to be** disconnected from the mains during repairs.
Past Simple	**NEEDED TO** **HAD TO**	We **needed to/had to** heat the valves before use.
Past Simple negative	**DID NOT NEED TO** **DID NOT HAVE TO** **NEED NOT HAVE**	We **did not need to/did not have to** heat the valves before use. We **need not have** heated the valves before use.

注释:

• *We **did not need to/did not have** to heat the valves before use* does no t indicate whether or not you actually heated the valves, whereas *we **need not***

have *heated the valves before use* implies that you did heat them, but that it wasn't necessary.

- **Must not** means 'not allowed', it doesn't mean 'not necessary'.

MODAL SENTENCES EXERCISE

Complete the sentences using *could, must, may, should, might, ought to, need to, can, have to.* Make sure you use the right tense and don't forget t o use negative forms where necessary.

1. Perhaps the damage was caused by heat exposure.

The damage _____

2. We felt sure that the damage was caused by heat exposure.

The damage _____

3. No way was the damage caused by heat exposure.

The damage _____

4. We don't expect heat exposure to cause any damage.

Heat exposure _____

5. It's possible that the damage wasn't caused by heat exposure.

The damage _____

6. I advise you to heat it.

It _____

7. I don't think it was a good idea to expose it to heat.

It _____

关键

1. The damage may have been/might have been/could have been caused by heat exposure.
2. The damage must have been caused by heat exposure.
3. The damage cannot have been/could not have been caused by heat exposure.

4. Heat exposure should not cause any damage.
5. The damage may not have been/might not have been caused by heat exposure.
6. It should be heated.
7. It should not have been exposed to heat.

4.3 写作任务：构建模型

4.3.1 构建模型

您现在准备开始构建本节的模型。首先，在下面提供的空间中简要 描述作者在每个句子中所做的事情。关键在下一页。一旦您尝试制作自己的模型，您可以使用关键来帮助您在最终独立完成时撰写研 究文章的这一部分。

指南

您应该花费 30-45 分钟来完成此任务。如果您无法想到第一句的好 描述，请选择一个更简单的，例如句子 3，并从那里开始。请记住，您的模型只有在可以转移到其他讨论/结论时才有用，因此不要包含诸如压力等内容词，否则您将无法使用您的模型在您自己的领域生 成讨论/结论。

记住，了解作者在句子中所做的事情，而不是他/她所说的内容 的一种方法是想象你的电脑意外地删除了它。当它消失时，作为读 者的你有什么变化？如果你在电脑上按下另一个键，句子又出现了 ,这如何影响你对信息的反应?

如前面章节所提到的，了解作者在句子中所做的事情——而不 是他/她所说的内容——的另一种方法是查看语法和词汇线索。主要

动词的时态是什么？这个时态通常用于什么？它与前一句的时态相 同吗？如果不同，作者为什么改变了时态？作者选择使用了哪些词？

不要期望能产生一个完美的模型。当你查看关键部分时，你会 修改你的模型，也许在你将其与目标文章中的讨论/结论部分的工作 方式进行比较时还会再次修改。

Cognitive–behavioural stress management (CBSM) skills and quality of life in stress–related disorders ***Discussion*** **1** *Prior work has documented the effectiveness of psychosocial intervention in improving quality of life (QoL) and reducing stress in patients suffering from various disorders; Epstein,[18] for example, reports that orthopedic patients participating in a two-week multimedia intervention programme improved across several QoL indices, including interpersonal conflict and mental health.*	**In this sentence, the writer:** 1_____

2 *However, these studies have either been short-term studies or have not focused on patients whose disorder was stress-related.* **3** *In this study we tested the extent to which an extended three-month stress management programme improved QoL among a group ofpatients being treatedfor stress-related skin disorders such as eczema.*

4 *We found that in virtually all cases, participation in our three-month stress management programme was associated with substantial increases in the skills needed to improve QoL.* **5** *These findings extend those of Kaliom, confirming that a longer, more intensive period of stress-management training tends to produce more effective skills than when those skills are input over a shorter period via information transfer media such as leaflets and presentations(Kaliometal.,2003).* **6***In addition, the improvements noted in our study were unrelated to age, gender or ethnic background.* **7** *This study therefore indicates that the benefits gained from stress-management intervention may address QoL needs across a wide range of patients.*

8 *Most notably, this is the first study to our knowledge to investigate the effectiveness of extended psychosocial intervention in patients whose disorder is itself thought to be stress-related.* **9** *Our results provide compelling evidence for long-term involvement with such patients and suggest that this approach appears to be effective in counteracting stress that may exacerbate the disorder.* **10** *However, some limitations are worth noting.*

2_____

3_____

4_____

5_____

6_____

7_____

8_____

9 _____

10_____

11 *Although our hypotheses were supported statistically, the sample was not reassessed once the programme was over.* **12** *Future work should therefore include follow-up work designed to evaluate whether the skills are retained in the long term and also whether they continue to be used to improve QoL.*	11_____ 12_____

4.3.2 关键

In Sentence 1 *'Prior work has documented the effectiveness of psychosocial intervention in improving quality of life (QoL) and reducing stress in patients suffering from various disorders; Epstein,*[18] *for example, reports that orthopedic patients participating in a two-week multimedia intervention programme improved across several QoL indices, including interpersonal conflict and mental health.'* **the writer revisits previous research**.

为什么我应该通过回顾之前的研究来开始讨论?

子章节的开始应为该子章节提供一个简单的入口，讨论了在结果单 元中实现这一点的两种常规方法：通过一些一般性陈述预览该子章节的内容，从而提供该部分的概述，并回顾前面部分的内容以将其 与新内容联系起来。在结果部分中，我们看到作者可能会通过总结 或提及所使用的方法或材料来开始。然而，几乎不可能对讨论部分 进行概述。这是因为，与方法论或结果不同，讨论涵盖了多个领域 。因此，许多讨论/结论开始时会回顾前面部分的内容。这可以包括:

• 回顾引言部分，重申论文的研究目标、重要的背景事实信息、最初的预测/理论/假设，或该研究旨在解决的问题。

• 回顾方法学部分，以提醒程序选择的理由或对程序本身进行总结。

• 回顾结果部分，总结作者或他人获得的结果。

*我应该**选择**哪个？*

一个选项是重新审视您工作的最重要方面。如果您论文中最重要的 方面是它对您在引言中提出的差距或问题提供了强有力的回应，达成了您的目标和/或实际解决了问题，那么可以从回顾引言中的那个 差距、目标或问题开始。如果您使用的软件选择、遵循的程序或对 现有程序所做的修改是您工作的最重要方面，那么可以从重新审视 方法论开始。如果您的结果是论文中最重要的方面，因为它们确认 了一个理论或揭示了新的内容，那么可以从重新审视结果开始。第 一句话不应是随机选择。

您可以使用与您选择重新访问的部分中类似的语言——甚至类 似的句子。这将为读者提供一个"回声"，并帮助他们回忆起该部 分。在这里，作者对文献中提出的主张做出了强烈回应，因此使用 了与引言中用于陈述这些主张的词语和短语相似的语言。

In Sentence 2 '*However, these studies have either been short-term studies or have not focused on patients whose disorder was stress-related.*' **the writer revisits the Introduction to recall specific weakness in the methodology used in previous studies**.

由于本文的贡献在于本研究方法与以往研究方法之间的差异，作者首先在引言中重新审视了这一差距/问题，以回顾以往方法中的 不足之处，这些不足在本研究中得到了改进，然后转向本研究方法 与以往研究方法之间的具体差异。

在讨论的这个阶段，重复重要的背景事实信息也是非常常见的 ,以重新建立研究的理由或动机。事实上，背景事实信息在整个讨 论中是一个令人惊讶的常见特征。

In Sentence 3 '*In this study we tested the extent to which an extended three-month stress management programme improved QoL among a group of patients being treated for stress-related skin disorders such as eczema.*' **the writer revisits the methodology used in this study**.

如果我在这里重新审视方法论，我需要提供多少细节？

使用与方法论中相同的语言将帮助读者记住您方法的原则，并且在 这里回顾您方法的重要特征是很常见的。然而，尽管您可以在这里探讨您方法的细节，但不要添加新信息。如果关于您方法的信息足 够重要以至于需要包含在您的研究论文中，它应该首先在适当的位 置，即方法论中给出，然后在这里回顾。

我应该使用什么时态来描述我的方法论？

您可以使用一般过去时、一般现在时或现在完成时来回忆您的方法 或结果（在当前情况下，HI 被用来/已经被用来/曾被用来定义湍流结构的大小和形状）。如果您添加一个简短的结论，现在完成时或 一般现在时是常见的：我们使用/已经使用全息数据来重建三维结构

。

In Sentence 4 '*We found that in virtually all cases, participation in our three-month stress management programme was associated with substantial increases in the skills needed to improve QoL.*' **the writer revisits and summarises the results**.

这与结果的概述是一样的吗？

如果您在结果部分早期提供了结果的概述，那么这句话的内容甚至 结构可能非常相似。像这样的总结结果的句子在摘要中也可能是必要的——同样使用类似的语言和结构——请参见下一单元关于摘要 的内容。

所以我为什么也需要在这里重新审视或总结结果呢？

如果你查看本节开头的图表以及它对称的原因，你会发现讨论的一 个核心功能是超越结果，引导读者从对你结果的直接和狭隘的关注转向可以从这些结果中得出的结论和更广泛的影响或概括。总结结 果为这一过程提供了一个合适的起点。

> **In Sentence 5** '*These findings extend those of Kaliom, confirming that a longer, more intensive period of stress-management training tends to produce more effective skills than when those skills are input over a shorter period via information transfer media such as leaflets and presentations (Kaliom et al., 2003).*' **the writer shows where and how the present work fits into the research 'map' of this field**.

这是讨论部分的一项特点，在其他任何部分都未曾出现过。在引言中的简短文献综述中，您为读者描绘了您研究领域的当前研究现状。而现在，您需要向读者展示您的研究如何以及在何处融入这一图景，并说明它以何种方式改变或影响了该领域的研究"地图"。在讨论部分，明确您的研究与其他工作的关系是您的责任。

我的工作可能以哪些方式融入现有研究图景？

您的研究可能通过不同的方法得出了相似的结果，从而影响现有方法的认知；它可能证实了先前研究得出的结果；它可能与先前研究的结果相矛盾，进而对这些结果提出质疑；它可能提供了一种全新的方法或视角；或者，如当前的情况一样，它可能扩展了已有研究的结果，从而进一步确认这些研究的意义。您的工作与当前研究地图的关系可能有多种形式，而当您查看本单元后续提供的映射词汇时，这些形式可能会变得更加清晰。

我如何确定应该将我的工作与哪些研究进行映射？我可以在讨论部分首次提到其他研究吗？

在方法和结果部分，您已经将自己的研究与现有工作进行了比较，这些研究应成为您在讨论部分关注的重点。尽管您可以在讨论部分提

及之前未提到的研究，但在讨论中首次提到大量研究并不常见。您需要明确哪些研究受到您的工作的影响，并在论文的各个部分中适时提到这些研究，以便在讨论部分能够再次引用它们。

In Sentence 6 '*In addition, the improvements noted in our study were unrelated to age, gender or ethnic background.*' **the writer recalls an aspect of the results that represents a positive achievement or contribution of this work**.

讨论的另一个非常重要的特点是明确关注您工作的成就或贡献。请 具体说明您的成就的性质，使用积极的语言清晰地呈现好处或优势。不要害羞地陈述您的成就。尽管您知道自己所做工作的优点和所 获得的结果，但如果您没有明确说明，读者可能不会意识到您成就 的价值。

这与映射（mapping）并不完全相同吗?

两者在意图上相似，但在内容上有所不同。映射展示了研究成果在该领域研究图景中的位置，而研究成果本身通常会被单独陈述，以便读者能够独立于其对当前知识状态的影响，清楚地看到本研究所完成和发现的价值。

In Sentence 7 '*This study therefore indicates that the benefits gained from stress-management intervention may address QoL needs across a wide range of patients.*' **the writer focuses on the meaning and implications of the achievements in this work**.

如果结果的含义已经在结果部分提到过，这不是重复吗?

在结果单元中，我们看到在后期阶段开始从结果中得出含义。注意 到对这些含义的首次评论（如建议/表明的短语）被描述为一个关键的举动，它将研究文章的方向从中央的"报告"部分转向讨论/结论 。讨论中一个常见的错误是未能朝这个方向发展。仅仅用不同的语 言重新陈述结果的表面解释是不够的。在讨论中，您有责任建议为 什么结果

会如此发生，并提供对您发现和观察背后机制的解释。这 些建议、解释和含义在这里被精炼、发展和讨论。

研究写作和报告写作之间一个重要的区别在于，研究的目的不 仅仅是获得和描述结果；而是要在现有知识的背景下理解这些结果 ,并对其含义做出合理和有用的说明，即这些结果在该背景下意味 着什么。结果与最初的问题或难题有何关系？你的结果是否与其他 研究者的报告一致？如果你的结果出乎意料，试着解释原因。是否 有其他方式来解释你的结果？读者需要知道他们可以从你的研究中 可靠地获得什么，而这正是你的职责。**Saying what your results *are* is the central function of the Results section; talking about what they *mean* is the central function of the Discussion.**

<u>如果我自己也不确定我的结果的意义该怎么办?</u>

如果你观察讨论部分中陈述结果意义的方式，你会发现其语言与在结果部分中陈述意义的语言完全相同。常用表达包括“似乎……”“表明……”以及“暗示……”，并且大量使用诸如 may 和 could 这样的情态动词。这是因为科学研究从未达到一个所有问题都被完全解答的终点；后续的研究总是在不断完善和发展之前的研究。因此，大多数科学作者都非常谨慎，不会做出未经限定的概括。从下面加粗的词语可以看出，这位作者也不例外。

4 *We found that in* **virtually** *all cases, participation in our three-month stress management programme* **was associated with substantial** *increases in the skills needed to improve QoL.* **5** *These findings extend those of Kaliom, confirming that a longer, more intensive period of stress-management training* **tends to** *produce more effective skills than when those skills are input over a shorter period via information transfer media such as leaflets and presentations (Kaliom et al., 2003).* **6** *In addition, the improvements noted in our study were unrelated to age, gender or ethnic background.* ***7*** *This study therefore* **indicates that** *the benefits gained from stress-management intervention* **may** *address QoL needs across a wide range of patients.*

In Sentence 8 *'Most notably, this is the first study to our knowledge to investigate the effectiveness of extended psychosocial intervention in patients whose disorder is itself thought to be stress-related.'* **the writer notes that one of the achievements or contributions of this work is its novelty.**

这句话表明，在某些情况下，映射和成就非常相似，因为这项工作 的一个重要成就是，之前没有进行过这种类型的研究。

要完全确定到目前为止没有人做过某种特定类型的研究是非常困难的，因此在做出这种陈述之前，你应该尽可能彻底地进行检查。不要仅仅依赖互联网。你从互联网获取的信息只会与查找技巧相关，而且在类似的句子中犯错是不专业的。如我们在句子8中所见，即使做了充分的努力，作者仍然使用了"据我们所知"这个短语，以防某个研究被意外忽视。

In Sentence 9 *'Our results provide compelling evidence for long-term involvement with such patients and suggest that this approach appears to be effective in counteracting stress that may exacerbate the disorder.'*

the writer refines the implications of the results, including possible applications.

开发您工作的影响包括考虑您的结果可能如何被实施或在未来导致 应用。在这种情况下，结果暗示长期参与应该是未来治疗的一个方面。

假设我的工作没有任何明显的应用?

许多研究并没有明显的应用。然而，在你放弃认为你的工作可以被 应用或实施的想法之前，检查两个地方是个好主意。首先，查看你引言的开头，以及你所在领域相关工作的第一句和段落。这可能帮 助你看到你的论文中的发现可以以何种方式被使用，因为正如我们 在引言中看到的，第一句通常显示了这个研究领域的重要性或实用 性。另一个可能的来源是该领域已发表工作的讨论部分。

然而，您所参与的工作在这个阶段——或者说永远——可能没 有明确的应用。一些领域，例如工程，较其他领域更具实用性，研 究可以有多种功能——它可能旨在阐明一个理论，而不是寻求一个 可应用的方法。您不需要在没有应用的地方寻找或尝试创造应用。

In Sentences 10 and 11 *'However, some limitations are worth noting. Although our hypotheses were supported statistically, the sample was not reassessed once the programme was over.'* **the writer describes the limitations which should direct future research**.

这是我第三次提到局限性——第一次在方法论中，第二次在结 果中，现在在这里再次提到。我该如何决定在这里关注哪些局限性 呢?在讨论中提到您研究的局限性是为了指出未来工作的方向。

因此，您应该检查您的研究中可以在未来工作中解决的局限性，而不 是您研究领域固有的局限性或在不久的将来不太可能解决的问题。 尝试将此视为对研究社区的邀请，以继续并在您所研究的主题上取得进展。

请注意，正如之前提到限制的情况一样，积极的结果（我们的 假设在统计上得到了支持）被提及在限制附近，以减少其负面影响 —— 在这种情况下，积极的结果在同一句话中提到。

In Sentence 12 '*Future work should therefore include follow-up work designed to evaluate whether the skills are retained in the long term and also whether they continue to be used to improve QoL.'* **the writer suggests a specific area to be addressed in future work**.

注意在第12句中使用"*therefore*"将限制与未来研究联系起来。

为什么我应该尝试确定未来工作的方向——为什么不鼓励人们自己 决定呢?

一篇论文无法回答你研究领域中的所有问题，因此在撰写讨论部分时，你应当保持对更广泛背景的关注。接下来的研究应当走向何方

？最好的研究会为后续的研究开辟方向。邀请研究社区以特定方式继续你的研究有多重功能。首先，它为研究人员提供了一个明确的项目，这比模糊的建议更具吸引力，因此更可能被执行。其次，它鼓励从你的研究开始的直接延续，紧接着的研究将引用你的论文，从而提升你研究的地位。此外，回应你研究的困难或局限性的研究可能为你当前和未来的工作提供有用的数据。

4.3.3 模型

这里是我们收集的句子描述：

In Sentence 1	the writer revisits previous research.
In Sentence 2	the writer revisits the Introduction to recall specific weakness in the methodology used in previous studies.
In Sentence 3	the writer revisits the methodology used in this study.
In Sentence 4	the writer revisits and summarises the results.
In Sentence 5	the writer shows where and how the present work fits into the research 'map' in this field.
In Sentence 6	the writer recalls an aspect of the results that represents a positive achievement or contribution of this work.
In Sentence 7	the writer focuses on the meaning and impli – cations of the achievements in this work.
In Sentence 8	the writer notes that one of the achievements or contributions of this work is its novelty.
In Sentence 9	the writer refines the implications of the results, including possible applications.
In Sentences 10 and 11	the writer describes the limitations which should direct future research.
In Sentence 12	the writer suggests a specific area to be addressed in future work.

我们可以简化这些，使我们的模型具有四个基本组件。

1	REVISITING PREVIOUS SECTIONS SUMMARISING/REVISITING GENERAL OR KEY RESULTS
2	MAPPING (RELATIONSHIP TO EXISITING RESEARCH)

3	ACHIEVEMENT/CONTRIBUTION REFINING THE IMPLICATIONS
4	LIMITATIONS CURRENT AND FUTURE WORK APPLICATIONS

4.3.4 测试模型

下一步是查看该模型在真实讨论中的运作方式（但请记住，它可能被称为“总结与结论”），以及在您选择的目标文章中。以下是一 些真实研究文章的完整讨论和结论。通读它们，并在您认为看到模型组件（1 、2、 3或4）的地方标记。比如，如果您认为第一句话对 应于模型中的第1号，请在旁边写上1，依此类推。

On combining classifiers

7 CONCLUSIONS

The problem of combining classifiers which use different representations of the patterns to be classified was studied. We have developed a common theoretical framework for classifier combination and showed that many existing schemes can be considered as special cases of compound classification where all the pattern representations are used jointly to make a decision.

We have demonstrated that under different assumptions and using different approximations we can derive the commonly used classifier combination schemes such as the product rule, sum rule, min rule, max rule, median rule, and majority voting. The various classifier combination schemes were compared experimentally. A surprising outcome of the comparative study was that the combination rule developed under the most restrictive assumptions — the sum rule — outperformed other classifier combinations schemes. To explain this empirical finding, we investigated the sensitivity of various schemes to estimation errors. The sensitivity analysis has shown that the sum rule is most resilient to estimation errors and this may provide a plausible explanation for its superior performance.

Phosphorus removal by chemical precipitation in a biological aerated filter

DISCUSSION

Chemical dosing onto the top of the BAF produced excellent phosphorus removal efficiencies compared to the removal obtained by biological uptake. The performance of the plant was unaffected with respect to BOD, COD, suspended solids and TKN. In contrast with previous findings, using an aluminium based reagent (Rogalla *et al.,* 1990), the nitrification process was significantly affected. The use of spent pickle liquor dosing onto an activated sludge plant for phosphorus removal was also seen to affect nitrification, especially at high doses (Bliss *et al.,* 1994) although this waste product may contain contaminants toxic to nitrifying bacteria.

The resulting reduction in nitrification which occurred during chemical dosing of weight ratio 1:1.14 (P:Fe) coincided with the greatest BOD loading (1.74 kg/m^3 per day) and the highest NH4 loading (0.4 kg/m^3 per day). To achieve complete nitrification an average BOD loading of 1.6 kg/m^3 per day has been suggested (Stensel *et al.,* 1988), which was exceeded during this time. At higher BOD loadings the nitrifying bacteria may be outcompeted by the organisms responsible for carbon oxidation (Metcalf and Eddy Inc., 1979) and higher ammonia loadings can create extra pressure for the nitrifying bacteria. These conditions may also explain the increased oxygen demand. A more extensive study of the effects of iron dosing on the nitrification process may

be required, although the increased BOD loading most likely accounts for the reduction in this process.

The optimum chemical dose for phosphorus removal is dependant on the EC limit imposed, the stability of the process required and the capital/running costs available. Unfortunately, specific weight ratios could not be studied for any significant period of time due to the variable concentration of incoming phosphorus. The use of Fuzzy logic systems (Bulgin, 1994), to adjust the chemical dose with respect to the incoming total phosphorus, would have removed this problem. Overall the most stable and effective weight ratio was 1:1.50 (P:Fe). This is lower than the optimum ferric chloride dose found previously (Stensel *et al.,* 1988) of 1:2.00 (P:Fe), but a comparison of the performances of iron (II) and iron (III) salts would be useful. Although this produced the most stable effluent quality, its performance was not significantly different from that produced by a dosing ratio of 1:1.25. Providing the iron (II) solution is changed regularly, because it was at the end of each period when the removal efficiency deteriorated, a chemical dose ratio of 1:1.25 should be sufficient to meet EC limits of 1 mg/litre. If, however, a limit of 2 mg/litre has to be met, the dosing ratio can be lower; 1:1.00 would be a suitable ratio. This optimum ratio is much lower than for other precipitants and processes. For example, the use ofalum for phosphorus removal in aerated lagoons required a dosing ratio of 2.80:1 (weight ratio AI:P). This dose produced a 90% reduction of phosphorus on an average influent concentration of 4.80 mg/litre (Narasiah *et al.,* 1991). The addition of ferric chloride to the aeration basin of an activated sludge plant rarely achieved 0.5 mg/litre phosphorus concentrations in the effluent with weight ratios as high as 5.4:1 (Fe:P) (Wurhmann, 1968). Finally, the addition of sodium aluminate to the aeration basin of an activated sludge plant required doses of 1.7:1 (weight ratio AI:P) to produce a final effluent concentration of 1.5 mg/litre (Barth *et al.,* 1968).

In accordance with previous findings (Stensel et al., 1988), chemical dosing had no significant effect on headloss during operation of the BAF, even at the higher chemical doses. Further research investigating the effects of chemical dosing on full-scale BAFs may be beneficial. The use of ferrous salts for phosphorus

removal has produced good results on a pilot-scale plant. Full-scale chemical dosing with these salts has been practised for many years in Finland and Switzerland with similarly good results (Bundegaard and Tholander, 1978).

Generalized thermodynamic perturbation theory for polyatomic fluid mixtures. I. Formulation and results for chemical potentials

VIII. CONCLUSIONS

We have derived (Sec. III) exact results relating certain background pair correlation functions in a mixture to $\beta\Delta\mu e$. This derivation makes contact with earlier results obtained by us,[13,14] and clarifies, makes rigourous, and extends the approach of Stell and Zhou.[4–7] The results hold for mixtures of arbitrary compositions and for both FHS and non-FHS systems.

We have used thermodynamic arguments to develop a general EOS for mixtures of polyatomic molecules and their constituent atoms (Sec. IV), based solely on the ideal-associated solution approximation (IASA). When the exact result for $\beta\Delta\mu e$ from Sec. III is incorporated, this theory can be seen to be a generalization of the first-order thermodynamic perturbation theory of Wertheim,[2] originally developed for tangent fused-hard-sphere mixtures. One form of this theory is based upon and requires for its implementation only thermodynamic information for the reference mixture, and the alternative form requires structural information for the reference system in the form of the background correlation function $y^*(1, 2, \ldots, m)$. Since information of the latter kind is very difficult to obtain (apart from the diatomic case), we generally advocate use of the former form of the theory. We note that the generalized theory accounts for differences in structural isomers of polymeric species, unlike other approaches.[17]

We have demonstrated that alternative implementations of the generalized EOS for fused-hard-sphere systems produce slightly different results, depending on the way in which certain quantities are calculated (Sec. V). We showed that, for bonded-hard-sphere (BHS) systems, the thermodynamically based implementation yields results identical to those obtained by using the Boublik–Nezbeda equation of state,[8] and the alternative based

upon structural information yields similar, but not exact, results. This sheds light on the reason for the accuracy of results obtained by previous implementations of TPT1 for diatomic systems.[2,9,6]

We have derived expressions for the excess chemical potentials, consistent with the generalized EOS, for the components of mixtures of homonuclear polyatomic molecules and their constituent atoms (Sec. VI). Since the TPT and its generalizations have the practical drawback of requiring information concerning the properties of a reference mixture system, approximations implementable requiring only accurate knowledge of pure systems are more feasible. We have tested the results of the Lewis–Randall rule approximation[10] against those of other approximations and against some exact and near-exact results. It produces good results overall.

We have presented new and more accurate results for the individual $\beta\mu e$ and for $\beta\Delta\mu e$ for the system of tangent diatomic FHS molecules with size ratio 0.6 (System B), using both conventional NVT Monte Carlo simulations and the reaction ensemble method.[11] For this system, the simulation results show that $\beta\Delta\mu e$ is essentially independent of composition. The BNEOS was found to predict that $\beta\Delta\mu e$ is exactly independent of composition. We conjecture that this result holds for all BHS systems. This result is in agreement with the fundamental approximation of the IASA.

Optimal local discrimination of two multipartite pure states

7. Conclusion

We have demonstrated that any two multipartite pure states can be inconclusively discriminated optimally using only local operations. We have also shown that this is possible for certain mixed states and certain regimes of conclusive discrimination. We then turned our attention to finding sets of entangled states that can be recreated locally, thus allowing any global discrimination figure of merit to be achieved locally. We find that this is true for the Schmidt correlated states, and, as a consequence, this is also for any two maximally entangled states.

It would be interesting to know if there are many other states which can be locally recreated using other techniques. If this can be shown to apply to any two pure states, then we would know that

two pure states can be distinguished optimally under *any* figure of merit using only local operations.

Organic vapour phase deposition: a new method for the growth of organic thin films with large optical non-linearities

4. Conclusions

In summary, we have presented a new technique, organic vapour phase deposition, for the growth of extremely pure, strongly NLO-active films of DAST via the chemical reaction of two organic vapors in a hot-wall reactor. Analysis of the films by NMR, X-ray diffraction and second harmonic generation efficiency indicates that they are chemically pure, crystalline, and exist in the monoclinic structure which has previously been shown to exhibit very large second-order non-linear optical effects. By using different reactants, and with the appropriate combinations of bubblers and solid sources, OVPD can be applied to yield thin films of many different highly polar, NLP-active organic and organometallic salts, regardless of the high vapour pressures of the materials involved. To our knowledge, growth of such compounds has not previously been possible by established methods of thin film growth. We expect this technique to open up an entirely new range of materials and numerous novel photonic device applications.

现在在你的目标文章中做同样的事情。我们希望你能获得对模型的良好确认，并且现在可以回答本节开始时的三个问题：

- 我该如何开始这一部分？我应该以什么类型的句子开始？
- 这一部分应该包含什么类型的信息，顺序如何？
- 我该如何结束这一部分？

4.4 词汇

为了完成您需要撰写论文这一部分的信息，您现在需要为模型的每 个部分找到合适的词汇。本节中的词汇来自600多篇不同领域的研究 文章，这些文章均由母语者撰写并发表在科学期刊上。仅包含频繁出现的单词/短语；这意味着词汇表中包含的单词和短语被作者和编 辑都视为正常和可接受的。

在下一部分，我们将查看模型中以下领域的词汇，除了：

1. 回顾前面的部分

2. 总结/重访关键结果

3. 精炼含义

由于大部分所需的词汇可以在之前的部分找到，因此在这里无需额外的词汇输入；您可以参考引言、材料/方法和结果部分的词汇章节，找到适当的语言。在提炼研究含义时，请使用结果部分中“含义”词汇表中的适当语言，并避免得出没有充分数据支持的结论和含义。

4. 映射（与现有研究的关系）

这包括向读者展示您的贡献如何融入整体研究图景的方法。像“*consistent with* and *provides support for*”这样的短语在这里很常见。

5. 成就/贡献

您的成就/贡献通常在现在完成时中表述，特别是在您在结论中提及 时。以“*We have demonstrated/described/investigated/developed/shown /studied/ focused on etc.*”等开头的句子在这里很常见。

6. 限制/当前和未来的工作

这些通常非常接近（有时甚至在同一句话中出现），因为当前研究的局限性为未来的研究提供了方向和建议。描述局限性的词汇可以在前面的部分找到；未来研究的词汇包括“*should be replicated*”和“*further work is needed*”等短语。

7. 应用程序

您的工作可能没有任何直接或甚至间接的应用，但如果有，它们将在此提及。相关短语包括 *have potential 和 may eventually lead to.* 。包括应用让您 展示您的工作超越特定研究问题的狭隘目标的价值。应用和未来工 作都为您的研究文章与外部世界提供了一个接口，因此它们是结束 研究文章的常规方式。

4.4.1 词汇任务

查看本单元和目标文章中的讨论/结论。划线或突出显示您认为可以在上述七个领域中使用的所有单词和短语。

在以下页面可以找到有用语言的完整列表。这包括您突出显示 的所有单词和短语，以及一些其他常见的词汇。请仔细阅读，并在 字典中查找您不认识的任何词的意思。这个列表在许多年里都将非 常有用。

4.4.2 讨论/结论的词汇

1. 回顾前面的章节

2. 总结/回顾关键结果

3. 精炼结果的含义

当你回顾这些部分时，不要不必要地改变句子中的词语；你的目标是创造一种“回响”，让读者记起你之前说过的话，因此重复相同的词语和短语是有利的。

如果你从回顾材料/方法部分或引言开始，你可能还想在讨论/结论中总结或回顾重要的结果。你的结果是支持结论的关键证据，保持这些结果清晰地呈现在读者面前是有帮助的。

4. 映射（与现有研究的关系）

在讨论/结论中出现的名称和研究的选择对读者非常重要；他们需要 能够将研究项目归类在一起，并理解您的研究与现有研究的关系及其不同之处。您应该在研究“市场”的术语中识别您的“产品”。您还可以将其他研究者的工作/方法与您的进行比较，以验证您的工 作——或贬低他们的工作。

This/Our study/method/result/ approach is:	This/Our study:
analogous to comparable to compatible with consistent with identical (to) in contradiction to in contrast to in good agreement (with) in line with significantly different (to/from) the first of its kind (very/remarkably) similar (to) unlike	broadens challenges compares well (with) confirms contradicts corresponds to corroborates differs (from) extends expands goes against lends support to mirrors modifies proves provides insight into provides support for refutes supports tends to refute verify

注意：不要忘记，简单的比较（例如更强/更准确/更快等）是突出您 工作与其他相关工作之间差异的有效方式。

以下是这些如何使用的一些示例：

- **To the knowledge of the authors,** the data in Figs. 4–6 is the **first of its kind**.
- The results of this simulation therefore **challenge** Laskay's assumption that percentage porosity increases with increasing Mg levels.
- The GMD method provides results that **are comparable to** existing clay hydration processes.
- **Similar** films on gold nanoparticles have also been found to be liquid-like.
- Using this multi-grid solver, load information is propagated **faster** through the mesh.
- Our results are **in general agreement with** previous morphometric and DNA incorporation studies in the rat [2.6].
- Our current findings **expand** prior work.[5]

- The system described in this paper is **far less** sensitive to vibration or mechanical path changes than previous systems.
- **Unlike** McGowan, we did not identify 9-*cis* RA in the mouse lung.

5. 成就/贡献

如你所知，科研写作通常不允许使用感叹号（!），但用于陈述你的 成就或贡献的词汇仍然可以传达出成就是令人兴奋的。因此，词汇表被分为两个部分；第一部分是感叹号替代词列表，可以在成就非 常令人兴奋时使用，第二部分是稍微“酷一点”的——但仍然是积极的——语言列表。

!-替换

compelling crucial dramatic excellent exceptional exciting	overwhelming perfect powerful remarkable striking surprising

extraordinary ideal invaluable outstanding	undeniable unique unusual unprecedented vital

积极语言

accurate advantage appropriate attractive beneficial better clear comprehensive convenient convincing correct cost-effective easy effective efficient encouraging evident exact feasible flexible important low-cost novel productive realistic relevant robust	Useful verbs: assist compare well with confirm could lead to enable enhance ensure facilitate help to improve is able to offer an understanding of outperform prove provide a framework provide insight into provide the first evidence remove the need for represent a new approach to reveal rule out solve succeed in support yield

simple stable straightforward strong successful superior undeniable useful valid valuable	

以下是这些如何使用的一些示例：

- The presence of such high levels is a **novel** finding.
- We identify **dramatically** different profiles in adult lungs.
- Our results **provide compelling evidence** that this facilitated infection.
- These preliminary results demonstrate the **feasibility** of using hologram- based RI detectors.
- Our data **rule out** the possibility that this behaviour was a result of neurological abnormality.
- The system presented here is a **cost-effective** detection protocol.
- A **straightforward** analysis procedure was presented which **enables** the **accurate** prediction of column behaviour.
- Our study **provides the framework** for future studies to assess the performance characteristics.
- We have made the **surprising** observation that Bro1-GFP focus accumulation is also pH-dependent.
- We have derived **exact** analytic expressions for the percolation threshold.
- Our results provide a **clear** distinction between the functions of the pathway proteins.

6. 限制/当前和未来的研究

你通常会概述自己工作的局限性，但这并不是将其表达为工作中的问题，而是提供未来工作的建议。这种对研究社区的邀请通过传达该领域仍有大量研究空间，提升了你工作的地位。

请注意，使用*will*或现在进行时(*e.g. we will integrate/we are integrating this technique with the FEM implementations*)表示你自己的意图或正在进行的工作；而 *should*用于邀请他人进行研究(*This technique should be integrated with the FEM implementations*)。

a/the need for at present encouraging fruitful further investigations further work is needed further work is planned future work/studies should future work/studies will in future, care should be taken in future, it is advised that … holds promise interesting it would be beneficial/useful	possible direction promising recommend remain to be (identified) research opportunities should be explored should be replicated should be validated should be verified starting point the next stage urgent worthwhile

以下是这些如何使用的一些示例：

- Our results are **encouraging** and **should be validated** in a larger cohort of women.
- However, the neural mechanisms underlying these effects **remain to be** determined.
- This finding is **promising** and **should be explored** with other eukaryotes.
- **Future work should** focus on the efficacy of ligands synthesised in the Long group.
- An important question for **future studies** is to determine the antidepressant effects of such drugs.

7. APPLICATIONS/APPLICABILITY/IMPLEMENTATION

研究工作并不总是有明确的应用。然而，在某些情况下，工作如何被使用是显而易见的，特别是如果你的项目产生了某种设备或产品。在这种情况下，你应该指出可能的应用或适用性，在许多情况下,这可以从引言中早先提到的要点中得出。不要忘记使用情态动词,如 *could*、 *should* 和 *may*。

eventually in future soon possible	apply have potential implement lead to produce use utilise

以下是这些如何使用的一些示例：

- Our technique **can be applied to** a wide range of simulation applications.
- The PARSEX reactor therefore could be **used** for the realistic testing of a wide range of control algorithms.
- It **should be possible**, therefore, to integrate the HOE onto a microchip.
- This approach **has potential** in areas such as fluid density measurement.
- The solution method **could be applied** without difficulty to irregularly- shaped slabs.
- Our results mean that in dipping reservoirs, compositional gradients can now **be produced** very quickly.
- This could **eventually lead to** the identification of novel biomarkers.

4.5 撰写讨论/结论

在下一个任务中，你将整合并使用本单元中的所有信息。你将根据模型写一篇讨论/结论部分，使用你所学的语法和词汇，因此确保你手边有模型（第4.3.3节）和词汇（第4.4节）。

在本单元中，你已经学习了讨论/结论部分的常规模型，并收集了常规使用的词汇。记住，在写作时，你的句型也应遵循常规，因此可以使用你在本单元的讨论/结论部分以及目标文章中看到的句型作为写作中的句型模型。

这次请严格遵循模型，未来可以用它来检查你工作中的讨论/结论部分，以确保信息的顺序适当，并且你做到了读者在这一部分期望你做到的内容。

尽管在答案钥匙中提供了模型答案，但如果可能的话，你应该尽量让一位以英语为母语的人检查你的答案，以确保你正确使用了词汇。

4.5.1 撰写讨论/结论

在这个任务中，假设你和你的团队设计了一台可以去除地板和人行道上的口香糖的机器，通过化学处理将口香糖转化为粉末，然后使用吸尘装置将其去除。

在引言部分，你首先提到口香糖去除是一个重要的环境问题。接着，你提供了关于口香糖成分的信息1,2，以及它如何粘附在地面的方式6。随后，你回顾了现有的口香糖去除机器3,4，并指出研究表明，现有的机器无法在不损害地面表面的情况下使用吸力去除口香糖10。你还提到Gumbo等人的研究，声称可以使用化学物质溶解口香糖5。在引言的最后，你宣布你和你的研究团队设计了一台口香糖去除机（CGRM），名为GumGone。GumGone可以喷洒一种无毒化学物质，将口香糖转化为白色粉末。然后，机器可以用吸力去除口香糖，而不会损害地面表面。

在方法部分，你描述了机器的设计和构造。你将GumGone与两台现有机器Gumsucker3和Vacu-Gum4进行了比较。接着，你给出了你进行的一系列试验的详细信息，测试了新口香糖去除机的效率，另一组试验则展示了去除口香糖对地面表面效果的影响。

在结果部分，你展示了这些试验的结果。你比较了GumGone与Gumsucker和Vacu-Gum的表现。你的结果非常好，可以在下面的表格中看到。现在，请编写讨论/结论部分。

Table 1: Gum removal as a percentage of total sample

	Gumsucker	Vacu-gum	GumGone
Wooden floor	77	73	80
Stone floor	78	78	82
Carpeted floor	56	44	79

Table 2: Floor damage/staining

	Gumsucker	Vacu-gum	GumGone
Wooden floor	minimal	minimal	none
Stone floor	significant	some	none
Carpeted floor	significant	significant	minimal

Discussion

Gum removal technology has traditionally faced the problem of achieving effective gum removal with minimal damage to floor surfaces. Existing CGRMs such as Gumsucker and Vacu-Gum use steam heat and steam injection respectively to remove gum and although both are fairly effective, the resulting staining and damage to floor surfaces, particularly carpeted floors, is often significant.[10]

In this study the design and manufacture of a novel CGRM, GumGone, is presented. GumGone reduces the gum to a dry powder using a non-toxic chemical spray and then vacuums the residue, leaving virtually no stain. In trials, GumGone removed a high percentage of gum from all floor surfaces without causing floor damage. The floor surfaces tested included carpeted floors, suggesting that this technology is likely to have considerable commercial use.

Percentage removal levels achieved using GumGone were consistently higher than for existing CGRMs on all types of floor surface. This was particularly noticeable in the case of carpeted floor, where 79% of gum was removed from a 400 m^2 area, as

opposed to a maximum of 56% with existing machines. This represents a dramatic increase in the percentage amount of gum removed. Our results confirm the theory of Gumbo *et al*. that chemicals can be used to dissolve gum into dry powder and make it suitable for vacuuming.[5]

The greatest advantage over existing CGRMs, however, lies in the combination of the two technologies in a single machine. By reducing the delay period between gum treatment and gum removal, the GumGone system resulted in negligible staining of floor surfaces. This represents a new approach which removes the need for stain treatment or surface repair following gum removal.

As noted earlier, only one wattage level (400 watts of vacuum suction power) was available in the GumGone prototype. Further work is needed to determine the power level at which gum removal is maximised and floor damage remains negligible.

单元 5 撰写摘要

5.1 结构

近年来，摘要的结构和内容发生了变化。在在线出版数据库如科学引文索引出现之前，摘要通常印刷在研究文章的顶部，其主要功能是鼓励读者继续阅读文章，并通过提供简要预览来促进阅读。读者 和作者并不认为研究文章的摘要是一个独立的单元，因为通常不会 在没有参考文章本身的情况下阅读摘要。

互联网影响了科学研究的传播方式以及科学家获取已发表研究 的方式。摘要数据库允许科学家搜索和浏览科学文献，然后决定他 们想要详细阅读哪些研究文章。一些读者只是想了解他们研究领域 的动态，可能对细节不感兴趣；而另一些读者可能想了解细节，但 只对与他们自己研究直接相关的研究文章感兴趣。然而，如果读者 真的要阅读你的研究文章，摘要现在需要说服他们获取一份副本， 而不仅仅是鼓励他们继续阅读已经访问的论文。

摘要在在线数据库中竞争注意力。阅读标题的人会比阅读摘要 的人多得多，而阅读摘要的人又会比阅读整篇论文的人多得多。这意味着无论摘要写得多么“好”或多么精炼，它都需要具有独立的 有效性。它应该作为一份独立、自足的研究文章描述而有意义，读 者应该能够理解研究的关键点和结果，即使他们从未看到整篇文章 。从这个意义上说，摘要是研究文章的一个表现。

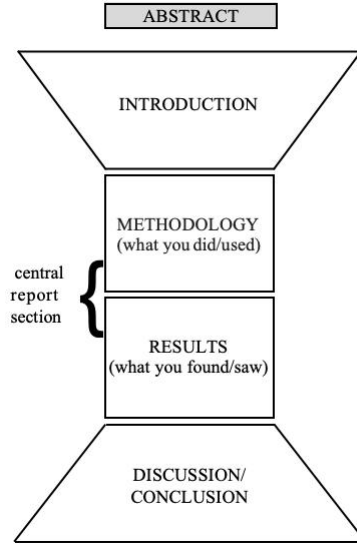


图 1. 研究文章或论文的结构。

为什么摘要这一单元会放在本书的最后而不是开头?

首先，摘要的风格和长度取决于您计划提交的地方，而这个决定可能在写作过程的后期甚至之后做出。然而，将这一单元放在书末的最重要原因是，在您完成论文的其他部分后，您更有能力撰写摘要 。摘要的内容源自文章的其余部分，而不是反过来。尽管您不应简 单地从文章主体中剪切和粘贴完整的句子，但摘要不应包含文章中 未出现的材料。这意味着您不需要创建完全新的句子；一旦您决定 摘要中应包含什么，您可以从论文的相关部分选择材料，包括句子 的部分和短

语，并进行调整或修改以满足摘要的要求。这也意味着 摘要比论文的其他部分更容易撰写！

每个摘要都遵循相同的模型吗?

不，摘要的标题反映了这一点。有些称为总结，有些称为背景，有 些称为摘要，而其他的则根本没有标题。大多数摘要都是以结果为中心，所有摘要之间有基本的相似性，但有两种截然不同的模型。 第一种模型类似于总结，结构非常清晰。它涉及研究文章的所有主 要子部分，甚至可以有诸如背景/方法/结果/结论等副标题。第二种 模型更为常见，主要集中在研究的一个或两个方面，通常——但并 不总是——是方法和结果。这里将讨论这两种模型。请注意，这里 描述的摘要模型适用于文章、论文、学位论文等。会议的摘要可能 不遵循这两种模型。

我怎么知道选择哪个模型?

此决定基于您所做的研究类型以及您希望发表研究的期刊的作者指南。该决定通常由期刊而非作者决定。如果选择在您手中，那么一般来说，您的研究主题越狭窄和具体，您使用摘要格式的可能性就 越小。这是因为在一个狭窄的研究领域，大多数读者已经了解背景 。每个期刊设定的字数限制对摘要的结构以及内容也有显著影响。

所以如你所见，当我们来问我们的三个问题时：

- 我该如何开始摘要？我应该以什么类型的句子开头?
- 摘要中应包含什么类型的信息，顺序如何?
- 如何结束这一部分?

你已经知道了关于摘要应包含什么内容以及其顺序的许多信息。以下是两种模型的示例。

下面是两种模式的例子。记住，模型2的摘要比模型1更常见。

首先阅读下面的摘要，这是一个使用摘要格式（模型1）的结构化摘要示例。论文标题为：**Physical properties of petroleum reservoir fluids derived from acoustic measurements**。如果你对诸如气泡点等术语感到困惑，请不要担心。在这一阶段，只需尽量了解一般概念，并熟悉其结构即可。

模型1

Abstract: *The speed of sound in a fluid is determined by, and therefore an indicator of, the thermodynamic properties of that fluid. The aim of this study was to investigate the use of an ultrasonic cell to determine crude oil properties, in particular oil density. An ultrasonic cell was constructed to measure the speed of sound and tested in a crude oil sample. The speed of sound was measured at temperatures between 260 and 411 K at pressures up to 75 MPs.The measurements were shown to lead to an accurate determination of the bubble point of the oil. This indicates that there is a possibility of obtaining fluid density from sound speed measurements and suggests that it is possible to measure sound absorption with an ultrasonic cell to determine oil viscosity.*

现在来看一个第二种更常见的摘要类型的例子。本文的标题是：**Effect of polymer coatings on drug release**。

模型 2

Abstract: *This study investigated the use of a novel water-soluble polymer blend as a coating to control drug release. It was found that using a blend of methylcellulose and a water-soluble copolymer significantly slowed the release rate of ibuprofen compounds in vitro and allowed for a more consistent release rate of 10–20% per hour.*

5.2 语法和写作技能

因为摘要是从文章的其余部分派生出来的，所以大部分语法和写作 技巧已经在之前的单元中涵盖。然而，动词时态的使用在摘要中非常重要。本节还涉及摘要的长度和语言。

5.2.1 动词时态

动词时态在摘要中尤其重要，因为严格的字数限制意味着您可能需 要省略那些告诉读者您所指的工作或您对结果的看法的短语。在这种情况下，可以通过仔细和准确地使用动词时态来实现这些。

请记住，您在句子中使用的时态可能在语法上是正确的——因 此没有编辑或校对者会注意到它或引起您的注意——但如果您没有 选择适当的时态，句子将不会表达您想要的意思，也不会产生您希 望的效果。

gap/problem通常出现在一般现在时中：

The main problem, however, is…
We examine why these models have difficulty with…
However, this assumption is not valid when…
This is complicated by…
However, this assessment cannot be based solely on…
Although it is known theoretically that…

当你提到what the paper itself does或what is actually in the paper itself，使用一般现在时，例如：

This paper presents a new methodology for…
In this paper we apply…
This study reports an improved design for…
In this paper we extend an existing approach to…
We consider a novel system of…
The implications for learning algorithms are discussed…
New numerical results are presented here for…

当你提到你的methodology或你在研究期间所做的事情时，通常使用过去简单时态，例如：

Two catalysts were examined in order to…
Samples were prepared for electron microscopy using…
A crystalliser was constructed using…
The effect of pH was investigated by means of…
The data obtained were evaluated using…
A permeameter was used to investigate…

也可以使用一般现在时来谈论您的methodology，特别是当您提到可以在论文中找到的计算或方程时：

Numerical examples are analysed in detail…
The calculated wavelengths are compared to…
Several models are created using…
The accuracy is evaluated by…
A detailed comparison is made between…
The method is illustrated on blends of homopolymers…

结果可以用一般现在时表达，例如：

We find that oxygen reduction may occur up to 20 microns from the interface…
The model consistently underpredicts…
The ratio shifts towards…
We show that this theory also applies to…
The most accurate readings are obtained from…
We find that this does not vary…
These examples illustrate that overpotential is better described in terms of…

或者，更常见的是用一般过去时，例如：

The Y-type was found to produce…
The hydrocarbons showed a marked increase in…
No dilation was observed… This was consistent with…
Organised fibers were found after 6 weeks … These profiles were affected by…
This finding correlated with…

但要注意，句子可能使用两种不同的时态。即使句子的第一部分是 过去简单时态 (*We found/It was found etc.*)，如果你认为 finding/result 本身 或结果的含义足够强，可以被视为事实或真理，你可以决定将其放 在现在简单时态。

The experiments demonstrated there are two matrices
... It was found that proteins are produced from ...
The results demonstrated that the morphology is different...
This image suggested that there is a direct relationship between ...

关于这一选择的一些原因在引言单元（第1.2.1节）和结果单元（第3.4.2节）中进行了讨论。除了那里提到的原因外，还值得注意的是，摘要通常以相当直接的方式呈现论文内容，这不仅是由于编辑施加的字数限制，还为了吸引读者的注意。这影响了在结果或影响部分使用现在简单时态的决定，尽管这些影响在文章本身中可能是用过去简单时态表述的。

成就可以用现在完成时来表达，例如在讨论/结论部分中：

We have obtained accurate quantitative LIF measurements
... This investigation has revealed that...
We have devised a strategy which allows ...
We have demonstrated the feasibility of this approach
by... A novel material has been produced which ...
Three-dimensional FE predictions have confirmed
that... Considerable insight has been gained
concerning...

并且在一般现在时中：

This process can successfully be combined with ...
The framework described here is both simple and universal ...
The value of our approach lies in ...
This provides a powerful tool for...
This novel film is mechanically robust and is able to...
The algorithm presented here ensures that...

应用通常以一般现在时表述：

This process is suitable for the production of...
This framework can be used to evaluate ...
This approach can be applied to...

This demonstrates potential for general applicability to…
These profiles may serve as a predictor for…
This framework can be used to evaluate…

5.2.2 长度

摘要通常有严格的字数限制。大多数在80到150个字之间，并且以单 段形式撰写。即使是更长的摘要（150到250个字）通常也以单段形式撰写。请勿提交超过字数限制的摘要，否则可能会被编辑以不恰 当的方式删减，从而无法准确代表您的工作。

对于你的初稿，不要过于担心字数限制。一旦你决定使用哪种摘要模型，就可以开始包含你认为重要的内容，然后逐渐删除那些不必要的词、短语甚至句子。

5.2.3 语言

考虑一下寻找您研究的人可能使用的搜索短语和关键词。确保这些确切的词语或短语出现在您的摘要中，以便它们能够在搜索结果列表的顶部显示。

摘要有时会以比文章本身略微不那么技术性的方式撰写，以吸引更广泛的受众。这可能意味着您的某些读者对您想要包含的特定术语或缩写不太了解。为了解决这个问题，您可以在摘要中使用缩写、简写或技术术语，但您应该首先说明其含义或代表的内容。例如：

Granules of hydroxyapatite (HA) were implanted.

5.3 写作任务：构建模型

5.3.1 构建模型

您现在准备通过在下面提供的空间中写下每个句子中作者所做的简短描述来构建摘要的模型。这应该非常简单，因为摘要的所有组成部分都在之前的子部分中出现过。与之前一样，关键在下一页。

指南

这一次，您需要构建两个模型，以涵盖两种类型的摘要。您只需要花费10到20分钟完成此任务，因为句子类型您在之前的单元中已经很熟悉。请不要忘记，您的模型只有在可以转移到其他摘要时才有用，因此不要包含内容词，否则您将无法使用这些模型生成自己的摘要。

请记住，了解作者在句子中所做的事情，而不仅仅是他/她所说的内容的一个方法是想象您的计算机不小心删除了这句话。当这句话消失时，作为读者，您的感受会发生什么变化？如果您按下计算机上的另一个键，这句话又回来了，那将如何影响您对信息的反应？

正如前面部分提到的，另一种了解作者所做事情的方法是观察语法和词汇线索。主要动词的时态是什么？这种时态通常用于什么？它与前一句的时态相同吗？如果不同，为什么作者改变了时态？作者选择使用了哪些词？

这一次，您可能会发现自己产生了完美的模型，但在与目标文章中的摘要写作方式进行比较时，您仍然可能会对它们进行修改，特别是第二种类型。

模型 1

Physical properties of crude oil from acoustic measurements ***Abstract*** **1** *The speed of sound in a fluid is determined by, and therefore an indicator of, the thermodynamic properties of that fluid.* **2** *The aim of this study was to investigate the use of an ultrasonic cell to determine crude oil properties, in particular oil density.* **3** *An ultrasonic cell was constructed to measure the speed of sound and tested in a crude oil sample.* **4** *The speed of sound was measured at temperatures between 260 and 411 K at pressures up to 75 MPs.* **5** *The measurements were shown to lead to an accurate determination of the bubble point of the oil.* **6** *This indicates that there is a possibility of obtaining fluid density from sound speed measurements and suggests that it is possible to measure sound absorption with an ultrasonic cell to determine oil viscosity.*	**In this sentence, the writer:** 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____

5.3.2 关键

In Sentence 1 '*The speed of sound in a fluid is determined by, and therefore an indicator of, the thermodynamic properties of that fluid.*' **the writer provides background factual information**.

我怎么知道应该提供什么样的背景信息?

这种类型的摘要开头的背景信息通常来源于引言的第一句话。

在这个特定的摘要中，信息提供了一个事实背景。其他类型的 背景也可能是合适的；例如，如果你的研究领域是废水处理或空气 污染，那么提及政治背景可能会很有用。

我应该提供多少背景信息？

在一些期刊中，这种类型的摘要有副标题，即背景/方法/结果/结论;如果有，字数通常在不同部分之间分配得相当均匀，但如果没有 ,分配则由作者决定，每个部分在摘要中所占的比例差异很大。如 果您觉得理解摘要本身需要很多背景信息，请将相关要点结合起来 ,并尽可能用少量的词进行总结。摘要的重点更可能在于方法论或 结果，因此将背景信息限制在一到两句话内。

在摘要中可以使用研究引用吗？

研究背景可能是必要的，尽管很少包括实际的研究引用。然而，如 果您的文章直接基于已发表的论文，或是对某一特定工作或理论的重大进展或矛盾，您应该在摘要中引用相关论文。

In Sentence 2 '*The aim of this study was to investigate the use of an ultrasonic cell to determine crude oil properties, in particular oil density.*' **the writer combines the method, the general aim and the specific aim of the study in one sentence**.

尝试以一种缩短摘要总长度的方式组合句子。您可以通过将背景信息和目标，或者本文所做的内容和发现的结果结合起来，从而减少单词数量，使句子具有多个目的。诸如"*In order to determine x we did y*"的句子将目标和方法合并为一个句子。

In Sentences 3 and 4 '*An ultrasonic cell was constructed to measure the speed of sound and tested in a crude oil sample.* **4** *The speed of sound was measured at temperatures between 260 and 411 K at pressures up to 75 MPs.*' **the writer summarises the methodology and provides details**.

我应该提供多少细节?

这取决于细节的重要性。在这种情况下，方法论是研究的主要焦点 ;研究的目的是调查超声细胞的使用（句子2）。如果你的工作的重要贡献确实在于方法论的细节，你可以并且应该在摘要中提供这些 细节，甚至可以以数字形式给出这些细节。常见的情况是找到给出 温度、压力、时间、数量、厚度甚至光吸收数据的句子。然而，在 许多其他情况下，研究的重点——因此摘要的重点——并不在于方 法论，在这种情况下，它以摘要形式给出，细节则保留给结果部分。

In Sentence 5 '*The measurements were shown to lead to an accurate determination of the bubble point of the oil.*' **the writer indicates the achievement of the study**.

摘要的一个核心功能是强调研究的新成就和重要成就。几乎所有的摘要在这一点上也都包含积极的语言（准确的判断），以展示工作的价值。

In Sentence 6 '*This indicates that there is a possibility of obtainingfluid density from sound speed measurements and suggests that it is possible to measure sound absorption with an ultrasonic cell to determine oil viscosity.*' **the writer presents the implications of the study**.

另一个重要的功能是展示研究的影响如何为该领域的知识和信 息做出贡献，这可以从研究的目标或研究所解决的差距或问题中得 出（本研究的目的是调查使用超声波细胞来确定原油性质，特别是 油密度）。

可以提到许多类型的影响；例如，根据您的发现，可能会对相 关问题或之前的研究产生影响。

这些含义似乎相当模糊——“可能”这样的语言在这里真的合适吗？

确实，像“因此可能是这样的”以及你在第3.2.4节看到的其他短语在这里并不常见。结果、影响和成就通常被相当强烈地陈述，这鼓 励读者以积极的态度阅读文章的其余部分并接受结论。也确实如此 ,关于影响的限定和讨论，包括可能的限制和约束，可以留给文章 本身。然而，你在摘要中报告的内容应该与论文中报告的内容一致 ,如果你的工作代表了突破的早期阶段或你的工作的影响仍然不确 定，那么通过包含情态动词（*could/might/may*）或诸如“*possible*”的 词来传达这一点是合适的。

如果我的研究存在问题，我该如何处理——我需要在摘要中提到这些问题吗?

如果这些问题非常重要，那么是的，您可以提到，并简要说明它们是什么。最好不要说某些内容会在后面讨论。摘要应该提供/总结您发现的确切细节。重要的影响、数据和发现应该包括在内，而不是遗漏。这包括问题，前提是（但仅在它们重要的情况下）以及未来工作的方向。这两者在摘要中相对较少见。

模型 2

Effect of polymer coatings on drug release ***Abstract*** **1** *This paper reports the use of a novel water-soluble polymer blend as a coating to control drug release.* **2** *It was found that using a blend of methylcellulose and a water-soluble copolymer significantly slowed the release rate of ibuprofen compounds in vitro and allowedfor a more consistent release rate of 10–20% per hour.*	**In this sentence, the writer:** _____ 1 2_____

In Sentence 1 '*This paper reports the use of a novel water-soluble polymer blend as a coating to control drug release.*'**the writer combines what the paper does** (*This paper reports*), **the method or materials used** (*water-soluble polymer blend*),**the contribution (***novel***) and the aim of the study (***to control drug release***).**

这显示了为什么仅仅复制研究文章中的句子并不是一个好主意。摘要中的字数限制意味着你可能没有空间写一句描述你使用的方法的句子和另一句陈述你研究目的的句子；你需要找到一种将这些元素结合起来的方法。看看这些组合：

差距/成就

In contrast to traditional approaches to water distribution planning based on cost, the model proposed here allows issues such as quality of supply to be considered.

成就/方法

A substantial increase in catalyst productivity was achieved by nanofiltration-coupled catalysis.

问题/方法

In order to select the optimum strategy in an environment with multiple objectives, a decision-aid tool for optimal life-cycle assess- ment was used.

In Sentence 2 '*It was found that using a blend of methylcellulose and a water-soluble copolymer significantly slowed the release rate of ibuprofen compounds in vitro and allowedfor a more consistent release rate of 10–20% per hour.*' **the writer refers to the method in more detail and provides numerical details of the results**.

即使摘要很简短，它仍然必须做几乎与论文一样多的工作，并且它仍然应该告知潜在读者该文章是否适合他们的需求。如果读者在不 知道您是否使用了模拟、分析模型、原型构建或现场数据分析的情 况下无法决定是否阅读论文，您应该包含这些信息。如果您工作的 价值和相关性在于您进行了许多不同参数的实验，而不是单一案例 研究，您应该包含该信息。如果在这种情况下，工作的价值是*a more consistent release rate of 10–20% per hour*，那么这应该包含在摘要中。

我应该提供多少结果的细节？

结果可能是这种类型的摘要中最重要的组成部分，您应该具体说明 并提供关键结果的详细信息。避免使用模糊的词汇，如小或更好。如果您提供"裸数字"，请尽量包含定量语言，例如***only*** *38%* or ***as high as*** *15%*，以便这些数字不会被误解。在这种情况下，作者不仅提到更一 致的释放率，还包括了实际的数值结果（*a more consistent release rate of* ***10–20% per hour***）。出于同样的原因，当您描述您的方法时，不应使用不清晰 的术语，例如使用了各种方法。

5.3.3 模型

这里是我们收集的句子描述：

MODEL 1

In Sentence 1	**the writer provides background factual information.**
In Sentence 2	**the writer combines the method, the general aim and the specific aim of the study in one sentence.**
In Sentences 3 and 4	**the writer summarises the methodology and provides details.**
In Sentence 5	**the writer indicates the achievement of the study.**
In Sentence 6	**the writer presents the implications of the study.**

MODEL 2

In Sentence 1	**the writer combines what the paper does, the method or materials used, the contribution and the aim of the study.**
In Sentence 2	**the writer refers to the method in more detail and provides numerical details of the results.**

与其构建两个不同的模型，不如在下面的框中给出的模型描述中包含这两种类型的摘要。我们可以简化我们收集的句子类型，使模型具有五个基本组成部分。

更结构化的类型，即模型 1，通常包括下面框中列出的前四个组成部分，且大致按照呈现的顺序排列；在这种类型的摘要中，每个组成部分往往是分开出现的。这些结构化摘要偶尔会包含第五个组成部分，即局限性和/或未来工作。

模型 2 仅选择两个或三个组成部分，并倾向于在可能的情况下将组成部分组合成一个句子。组成部分通常包括结果和/或成就，且常常包含方法论，但这取决于研究领域和具体程度。更广泛的研究重点可

能需要在摘要中包括背景或目标。在模型 2 中，组成部分的顺序非常灵活——一般遵循的唯一模式是方法论通常出现在结果之前。

1	BACKGROUND AIM PROBLEM WHAT THE PAPER DOES
2	METHODOLOGY/MATERIALS
3	RESULTS ACHIEVEMENT/CONTRIBUTION IMPLICATIONS
4	APPLICATIONS
5	LIMITATIONS FUTURE WORK

5.3.4 测试模型

下一步是查看该模型在一些真实摘要中的工作方式。这里有两个来 自真实研究文章的摘要。通读它们，并在你认为看到模型组件（1、 2、 3 、4或5）的地方标记它们。例如，如果你认为第一句话对应于模型中的数字1，就在旁边写上1，等等。

Effects of H_2O on structure of acid-catalysed SiO_2 sol-gel films

Abstract

Thin silica films were deposited on silicon wafers by the sol-gel technique, using spin coating. The sols were prepared by HCl catalysis of tetraethylorthosilicate (TEOS) diluted in ethanol, using

different molar ratios,*R,* of H_2O:TEOS. The films were then baked at various temperatures, and characterised using ellipsometry, profilometry, optical scattering and infrared spectroscopy. It was found that the thickness, shrinkage, porosity and pore sizes all decrease with increasing *R*. it was also found that high water levels yield films of higher homogeneity and finer texture, and less tensile stress.

Limitations of charge-transfer models for mixed-conducting oxygen electrodes

Abstract

A framework is presented for defining charge-transfer and non-charge-transfer processes in solid state electrochemical systems. We examine why charge-transfer models have difficulty modelling non-charge-transfer effects, and walk through several examples including the ALS model for oxygen reduction on a porous mixed-conducting oxygen electrode. These examples illustrate that electrode 'overpotential' is often better described in terms of macroscopic thermodynamic gradients of chemical species. In the case of a porous mixed conducting oxygen electrode, oxygen reduction is limited by chemical reaction and diffusion, and may occur up to 20 microns from the electrochemical (charge-transfer) interface.

OPTIMIZATION AND SENSITIVITY ANALYSIS FOR MULTIRESPONSE PARAMETER ESTIMATION IN SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS

Abstract

Methodology for the simultaneous solution of ordinary differential equations (ODEs) and associated parametric sensitivity equations using the Decoupled Direct Method (DDM) is presented with respect to its applicability to multiresponse parameter estimation for systems described by nonlinear ordinary differential equations.

The DDM is extended to provide second order sensitivity coefficients and incorporated in multiresponse parameter estimation algorithms utilizing a modified Newton scheme as well as a hybrid Newton/Gauss–Newton optimization algorithm. Significant improvements in performance are observed with use of both the second order sensitivities and hybrid optimization method. In this work, our extension of the DDM to evaluate second order sensitivities and development of new hybrid estimation techniques provide ways to minimize the well-known drawbacks normally associated with second-order optimization methods and expand the possibility of realizing their benefits, particularly for multiresponse parameter estimation in systems of ODEs.

Semi-continuous nanofiltration-coupled Heck reactions as a new approach to improve productivity of homogeneous catalysts

Abstract

Substantial increase in homogeneous catalyst productivity for a well known Heck coupling was achieved by nanofiltration-coupled catalysis. The use of nanofiltration membranes enabled catalyst separation and allowed subsequent catalyst recycle and reuse. This new technique demonstrated potential for general applicability to homogeneously catalysed organic syntheses.

Ras isoforms vary in their ability to activate Raf-1 and phosphoinositide 3-kinase

Ha-, N-, and Ki-Ras are ubiquitously expressed in mammalian cells and can all interact with the same set of effector proteins. We show here, however, that *in vivo* there are marked quantitative differences in the ability of Ki- and Ha-Ras to activate Raf-1 and phosphoinositide 3-kinase. Thus, Ki-Ras both recruits Raf-1 to the plasma membrane more efficiently than Ha-Ras and is a more potent activator of membrane-recruited Raf-1 than Ha-Ras. In contrast, Ha-Ras is a more potent activator of phosphoinositide 3-kinase than Ki-Ras. Interestingly, the ability of Ha-Ras to recruit Raf-1 to the plasma membrane is significantly increased when the Ha-Ras hypervariable region is shortened so that the spacing of the Ha-Ras GTPase domains from the inner surface of the plasma membrane mimics that of Ki-Ras. Importantly, these

data show for the first time that the activation of different Ras isoforms can

have distinct biochemical consequences for the cell. The mutation of specific Ras isoforms in different human tumors can, therefore, also be rationalized.

现在在你的目标文章中做同样的事情。我们希望你能获得模型的良好确认，并找到本节开头问题的答案：

- 我该如何开始这一部分？我应该以什么类型的句子开头？
- 这个部分应该包含什么类型的信息，顺序是什么？
- 如何结束这一部分？

5.4 词汇

您已经拥有撰写论文这一部分所需的大部分信息，因为您可以在本 书的其他单元中找到所需的词汇/短语。然而，由于摘要需要被比文章本身更广泛的人群理解，摘要往往倾向于在可能的情况下使用更 简单、更常规的语言。因此，我们将查看模型每个部分中最常见的 词汇。

本节中的词汇表取自600多篇不同领域的摘要，这些摘要均由母语者撰写并发表在科学期刊上。仅包含在这组研究文章中频繁出现 的单词/短语；这意味着词汇表包含的单词和短语被作者和编辑都视 为正常和可接受的。

在下一节中，我们将查看模型各个领域的典型词汇。

5.4.1 词汇任务

查看本单元和每篇目标文章中的摘要。 在模型的每个部分下划线或突出显示您认为可以使用的所有单词和短语。 您应该能够从之前的部分中轻松识别它们。

在以下页面中可以找到有用语言的完整列表，当然也可以在之 前单元的相关部分找到。此列表包括您在本单元的摘要中突出显示 的所有单词和短语，以及您可能在目标文章中看到的其他内容。

5.4.2 抽象的词汇

1. 背景

您可以在第1单元，第1.4.2节中找到更多内容，以及这些内容如何使用的示例。

a number of studies exist(s) frequently generally is a common technique is/are assumed to is/are based on is/are determined by is/are influenced by is/are related to it has recently been shown that	it is known that it is widely accepted that occur(s) often popular produce(s) recent research recent studies recently recently-developed

目标

您可以在第1单元，第1.4.2节和第2单元，第2.4.2节中找到更多内容 ,以及这些内容如何使用的示例。

in order to our approach the aim of this study to compare	to examine to investigate to study with the aim of

问题

您可以在第1单元，第1.4.2节中找到更多内容，以及这些内容的使用示例。

(an) alternative approach a need for although complicated desirable difficulty disadvantage drawback essential expensive however	impractical inaccurate inconvenient it should be possible to limited not able to problem require risk time-consuming unsuccessful

这篇论文的内容

In this study/paper/investigation we *or* We	This study/paper/investigation
address analyse argue compare consider describe discuss emphasise examine extend introduce present propose review show	considers describes examines extends includes presents reports reviews

Note: It is also possible to use many of these verbs with *it* or, i.e. *In this paper* ***it*** *is shown/argued that…* or in the passive, i.e. *A framework* ***is presented****...*

2. 方法论/材料

您可以在第2单元，第2.4.2节中找到更多内容，以及这些内容如何使 用的示例。

was/were assembled was/were calculated was/were constructed was/were evaluated was/were formulated was/were measured	was/were modelled was/were performed was/were recorded was/were studied was/were treated was/were used

3. 结果

您可以在第3单元，第3.4.2节找到更多内容，以及这些内容如何使用 的示例。

caused decreased had no effect increased it was noted/observed that… occurred produced resulted in was identified	was/were achieved was/were found was/were identical was/were observed was/were obtained was/were present was/were unaffected (by) yielded

成就/贡献

您可以在第4单元，第4.4.2节中找到更多内容，以及这些内容如何使用的示例。

accurate	achieve
better	allow
consistent	demonstrate
effective	ensure
enhanced	guarantee
exact	obtain
improved	validate
new	
novel	
significant	compare well with
simple	for the first time
suitable	in good agreement
superior	

含义

您可以在第3单元，第3.4.2节找到更多内容，以及这些内容如何使用 的示例，但请记住在摘要中不要使用较弱的形式，例如*seem to suggest* 或 *tend to be related to*。

The evidence/These results…	it is thought that
	we conclude that
indicate(s) that	we suggest that
mean(s) that	
suggest(s) that	can
	may

4. 应用程序

您可以在第4单元，第4.4.2节中找到更多内容，以及这些内容如何使 用的示例。

applicability can be applied can be used	make it possible to potential use relevant for/in

5. 限制与未来工作

在摘要中很少提到局限性和未来的工作，而且通常只是简要提及。 您可以在第2单元，第2.4.2节，第3单元，第3.4.2节，以及第4单元， 第4.4.2节中找到更多信息，以及这些内容的使用示例。

a preliminary attempt not significant slightly	future directions future work

5.5 撰写摘要

在下一个任务中，您将汇集并使用本单元中的所有信息。您将根据 模型撰写摘要，使用您所学的语法和词汇，因此请确保您面前有模型（第5.3.3节）和词汇（第5.4节）。

在本单元中，您已经看到了两个摘要模型，并收集了常用的词 汇。请记住，当您写作时，您的句型也应该是常规的，因此请使用 本单元和您目标文章中的摘要句型作为您写作中句型的模型。

选择其中一个模型，这次严格遵循它，并在未来使用它来检查 你的摘要，以确保你在这一部分做了读者期望你做的事情。
尽管在答案钥匙中提供了模型答案，但如果可能的话，您应该 尝试让英语母语者检查您自己的答案，以确保您正确使用词汇。

5.5.1 撰写摘要

为第4单元第4.5.1节中用于撰写讨论/结论的相同研究撰写摘要。这里 完整重印，包括第4单元末尾关键部分的模型讨论。

> *Imagine that you and your team have designed a machine which can remove chewing gum from floors and pavements by treating the gum chemically to transform it into powder and then using vacuum suction to remove it.*

在引言部分，您首先指出了口香糖清除是一个重要的环境问题。接着，您提供了关于口香糖成分的事实信息，并解释了它是如何粘附在地面的。之后，您考察了现有的口香糖清除机器，并指出研究表明，这些机器无法在不损坏地面表面的情况下使用吸力去除口香糖。您提到了Gumbo等人的研究，声称可以使用化学物质溶解口香糖。在引言的最后，您宣布您和您的研究团队设计了一种口香糖清除机器（CGRM），您将其命名为GumGone。GumGone喷洒一种无毒化学物质在口香糖上，将其转化为白色粉末。该机器随后可以使用吸力去除口香糖，而不会损坏地面表面。

在方法部分，您描述了机器的设计和构造。您将您的CGRM GumGone与两种现有机器Gumsucker和Vacu-Gum进行了比较。然后，您详细介绍了一系列试验，以测试新CGRM的效率，以及另一组试验，显示了口香糖清除对地面表面的影响。

在结果部分，您展示了这些试验的结果。您比较了GumGone与Gumsucker和Vacu-Gum的性能。您的结果非常好，详细数据见下表。

Table 1: Gum removal as a percentage of total sample

	Gumsucker	Vacu-gum	GumGone
Wooden floor	77	73	80
Stone floor	78	78	82
Carpeted floor	56	44	79

Table 2: Floor damage/staining

	Gumsucker	Vacu-gum	GumGone
Wooden floor	minimal	minimal	none
Stone floor	significant	some	none
Carpeted floor	significant	significant	minimal

Discussion

Gum removal technology has traditionally faced the problem of achieving effective gum removal with minimal damage to floor surfaces. Existing CGRMs such as Gumsucker and Vacu-Gum use steam heat and steam injection respectively to remove gum and although both are fairly effective, the resulting staining and damage to floor surfaces, particularly carpeted floors, is often significant.[10]

In this study the design and manufacture of a novel CGRM, GumGone, is presented. GumGone reduces the gum to a dry powder using a non-toxic chemical spray and then vacuums the residue, leaving virtually no stain. In trials, GumGone removed a high percentage of gum from all floor surfaces without causing floor damage. The floor surfaces tested included carpeted floors, suggesting that this technology is likely to have considerable commercial use.

Percentage removal levels achieved using GumGone were consistently higher than for existing CGRMs on all types of floor surface. This was particularly noticeable in the case of carpeted floor, where 79% of gum was removed from a 400 m^2 area, as opposed to a maximum of 56% with existing machines. This represents a dramatic increase in the percentage amount of gum removed. Our results confirm the theory of Gumbo *et al*. that

chemicals can be used to dissolve gum into dry powder and make it suitable for vacuuming.[5]

The greatest advantage over existing CGRMs, however, lies in the combination of the two technologies in a single machine. By reducing the delay period between gum treatment and gum removal, the GumGone system resulted in negligible staining of floor surfaces. This represents a new approach which removes the need for stain treatment or surface repair following gum removal.

As noted earlier, only one wattage level (400 watts of vacuum suction power) was available in the GumGone prototype. Further work is needed to determine the power level at which gum removal is maximised and floor damage remains negligible.

5.5.2 关键

以下是示例答案。当你阅读它们时，思考每个句子中代表模型的哪个部分。

模型 1

Abstract

The fats and resins in chewing gum contribute to elasticity, bulk and texture but also increase staining. The aim of this study was to design a gum removal machine able to remove gum chemically with no stain residue. A machine, GumGone, was designed and constructed, which injected non-ionic detergent into gum deposits using a power spray and then immediately vacuumed the resulting powder. It was found that 1 µl of detergent achieved effective, stain-free removal over a 300 m^2 area. Performance was superior to existing systems and suggests that the delay between treatment and removal is a significant factor in staining.

Abstract
This paper reports the design of a gum removal machine, GumGone, which combines non-ionic detergent treatment with immediate vacuum removal to minimise stain residue. Tests were conducted over a 300 m^2 area and removal levels of between 79% to 80% were achieved. Residual staining levels were superior to existing systems.

5.6 创建标题

在第5.5节中提到，许多人会阅读标题，而不是摘要，阅读摘要的人数也远多于阅读全文。这是因为标题和摘要都能告诉读者这篇研究文章是否对他们有用。一个好的标题能够吸引读者，更重要的是能够吸引合适的读者。反之，如果标题不佳，研究文章可能无法达到适当的受众。

I don't know how to start constructing a title.

首先，回顾一下您的研究目标或您试图回答的问题。尝试将这个问题或难题转化为一个标题。例如，

What is the difference between x andy?

变为

A comparison of x andy
and
How does x affect y?

变为

The effect of x on y

一个好的标题是什么？//

标题应尽可能准确地预测和描述论文的内容。如果您的论文是案例 研究，标题应反映这一点：

Crack propagation in a pressurised pipe

如果这是一个更一般的调查，标题应指明这一点：

Crack initiation in pressurised pipes

标题应包含关键字，以便在搜索引擎上更容易检索到论文。它不一定要是一个完整的句子，但仍然应该有意义。请注意，研究文章的标题通常不使用标题格式；它们一般采用句子格式书写。

有一些语法问题值得注意。当您在构建标题时使用关键字时，务必小心创建复杂的复合名词。复合名词的简洁性对于非母语写作者非常诱人，英语对这种名词有较高的容忍度，但请确保复合名词没有歧义，可以被理解。请注意，复合名词右侧的名词是"真实"的名词，而位于左侧的任何名词在某种程度上起到形容词的作用，修饰右侧的名词。还请注意，构成复合名词的名词之间的关系可能包含您未曾考虑的选项：

- *an oil* ***can is a can*** *which may contain oil ....or it may be empty, but its normal use is to contain oil*
- *an oil can* ***opener is an opener*** *for cans which may contain oil*
- *an oil can opener repair* ***man is a man*** *who is able to repair cans which may contain oil*
- *an oil can opener repair man training* ***programme is a programme*** *to train men to repair openers for cans which may contain oil*
- *an oil can opener repair man training programme funding* ***problem is a problem*** *with the funding for the training programme to train men to repair openers for cans which may contain oil*

语法的另一个方面经常引起问题——不仅仅是在标题中——是介词的使用，例如*by, with, on, in,for*。介词不仅仅是一种将单词粘合在一起的胶水；它们对意义有深远的影响，而在标题中这种影响尤其显著

。例如，介词*with*可能意味着*using* 或*having*。某事的证据是倾向于支持或确认其存在或存在的证据。某事的证据是其存在或存在的实际可观察迹象。

*Filtering of code phase measures **from** dual-frequency gps receivers*

不同于

*Filtering of code phase measures **in** dual-frequency gps receivers*

和

Sensory components controlling bacterial nitrogen assimilation

比下句要清晰得多

Sensory components in bacterial nitrogen assimilation

由于这是一个非常复杂的领域，并且标题中的错误风险相当大，因此建议避免使用介词过多的结构，并在提交论文以供发表之前请母语同事检查标题。

好的标题通常简洁，因此不常用"*A study of...*"或"*An investigation into...*"等短语开头。它们也采用非常正式的英语，因此不常使用问号。

我该如何做才能确保读者准确评估我论文的价值?

如果研究中获得的结果代表了显著的成就，标题可以简单地陈述这些结果：

Ras isoforms vary in their ability to activate raf-1 and phosphoinositide 3-kinase

然而，在大多数情况下，标题并不是指示论文价值或其局限性的合适地方。中立地陈述你的标题；像"可靠"这样的词并不常见，情态动词如"*may/might/could*"也不常用。要小心不要设定在论文中未 能实现的

期望；例如，如果你的研究并未涉及所有substrates/systems/reactions等,标题应明确说明它所涉及的substrates/systems/reactions。

来源与致谢

作者希望感谢以下人士，并指出由于选择了摘录以提供良好写作的 示例，因此未包含图表和表格：

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此外，我想对伦敦帝国学院英语语言支持项目的同事们表示感 谢，感谢他们的所有建议，以及对多年来为本书提供研究文章和意 见的伦敦帝国学院的许多学生表示感谢。

我也感谢我亲爱的孩子们本、丹尼尔、利奥拉、约艾尔和亚历 克斯，感谢他们的热情和支持。

有用的资源和进一步阅读

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附录 A：科研写作中使用的缩略语

ABBREVIATION	FULL WORD/PHRASE	MEANING
c. (or *ca.*)	*circa*	about approximately around
cf.	*confer*	compare
et al.	*et alii*	and others
vs.	*versus*	as opposed to against in contrast to
i.e.	*id est*	that is in other words
e.g.	*exempli gratia*	for example
N.B.	*nota bene*	please note note well
p.a.	*per annum*	per year yearly

附录 B：科研写作中使用的前缀

将列B中的每个前缀与列A中的正确含义匹配。如果两个或多个前缀具有相同的含义，它们将一起列出。例如，poly-和multi-具有相同的含义（它们都表示“许多”），因此它们在列B中作为29和30一起列出。请注意，前缀dis-出现了两次，因为它有两个不同的含义。

COLUMN A MEANING	COLUMN B PREFIX
_____ above/more	1. **circum-**
_____ after	2. **pre-**
_____ again	3. **fore-**
_____ against	4. **ante-**
apart/away	5. **anti-**
_____ around	6. **contra-**
_____ backwards	7. **counter-**
_____ bad/badly	8. **auto-**
_____ before	9. **co-**
_____ between	10. **dis-**
_____ change	11. **de-**
_____ colour	12. **hyper-**
_____ different	13. **super-**
_____ equal	14. **ir-**
_____ first	15. **im-**
_____ half	16. **in-**
_____ hundred(th)	17. **un-**
_____ into/inside	18. **dis-**

_____	large/million	19.	non-
_____	many	20.	a-
_____	new	21.	an-
_____	not	22.	inter-
_____	one/single	23.	intr-
_____	same	24.	mal-
_____	self	25.	ill-
_____	similar	26.	mis-
_____	thousand	27.	neo-
_____	thousandth	28.	post-
_____	time	29.	poly-
_____	too	30.	multi-
_____	two	31.	uni-
_____	far/distant	32.	mono-
_____	under	33.	di-
_____	with/together	34.	bi-
_____	wrong	35.	semi-
		36.	
		37.	re-
		38.	
		39.	retro-
		40.	sub-
		41.	hypo-
		42.	infra-
		43.	hetero-
		44.	homo-
		45.	milli-
		46.	kilo-
		47.	
		48.	cent-
		49.	chron-
		50.	chrom-
		51.	iso-
		52.	equi-
		53.	over-
		54.	mega-
		55.	para-
		56.	prim-
			proto-
			tele-
			meta-

关键

MEANING		PREFIX	EXAMPLES
above/more	12. 13.	hyper– super–	hyperactive, hyperallergenic supernatural, supersonic
after	28.	post–	postgraduate, postwar
again	36.	re–	rebuild, rewrite
against	5. 6. 7.	anti– contra– counter–	antioxidant, antiseptic contradict, contraindication counteract, counterpoint
apart/away	10. 11.	dis– de–	disarmament, disintegrate decompose, dehydrate
around	1.	circum–	circumference, circumnavigate
backwards	37.	retro–	retroactive, retrovirus
bad/badly	24. 25.	mal– ill–	malformed, malfunction ill-defined, ill-judged
before	2. 3. 4.	pre– fore– ante–	preexisting, pretest forecast, foresee antechamber, antenatal
between	22.	inter–	interact, interface
change	56.	meta–	metamorphosis, metastasis
colour	47.	chrom–	chromaticity, chromosome
different	41.	hetero–	heterogeneous, heterosexual
equal	48 49.	iso– equi–	isometric, isosceles equidistant, equilateral
first	53. 54.	prim– proto–	primitive, primordial protoplasm, prototype

MEANING		PREFIX	EXAMPLES
half	35.	semi–	semi-automatic, semicircle
hundred/th	45.	cent–	centigrade, centimetre
into/inside	23.	intr–	intravenous, introduction
large/million	51.	mega–	megabyte, megaphone
many	29. 30.	poly– multi–	polysaccharide, polyvalent multicoloured, multicellular
new	27.	neo–	neonatal, neo-Darwinism
not	14. 15. 16. 17. 18. 19. 20. 21.	ir– im – in– un– dis– non– a– an–	irrelevant, irreversible imprecise, impure inaccurate, inconsistent unbend, uncouple dissatisfied, dissimilar nonexistent, non-standard asymmetrical, atypical anaerobic, anhydrous
one/single	31 32	uni– mono–	unicellular, uniform monomer, monotone
same	42.	homo–	homogeneous, homosexual
self	8.	auto–	autonomous, autopilot
similar	52.	para–	paramedic, parapsychology
thousand	44.	kilo–	kilogram, kilowatt
thousandth	43.	milli–	millisecond, millimeter
time	46.	chron–	chronological, chronometer
too	50.	over–	overheat, oversimplify

MEANING		PREFIX	EXAMPLES
two	33. 34.	di– bi–	dichloride, dioxide bicarbonate, bisect
far/distant	55.	tele–	telemetry, telescope
under	38. 39. 40.	sub– hypo– infra–	subset, subtitle hypoallergenic, hypothermia infrared, infrastructure
with/ together	9.	co–	coauthor, coordinate
wrong	26.	mis–	misjudge, misread

附录 C：拉丁语和希腊语 单数与复数形式

Singular	Plural
alga	algae
analysis	analyses
antenna	antennae
appendix	appendices
axis	axes
bacterium	bacteria
basis	bases
crisis	crises
criterion	criteria
curriculum	curricula
datum	data
diagnosis	diagnoses
formula	formulae
genus	genera
hypothesis	hypotheses
index	indexes/indices
locus	loci
matrix	matrixes/matrices
medium	media/mediums
nucleus	nuclei
ovum	ova
phenomenon	phenomena
psychosis	psychoses
radius	radii

Singular	Plural
serum	sera
spectrum	spectra
stimulus	stimuli
thesis	theses
vertebra	vertebrae
vortex	vortices

附录 D：有用的动词

accelerate	corroborate	imply	propose
accommodate	create	improve	prove
accompany	deal with	include	provide
account for	debate	incorporate	publish
achieve	decline	increase	purchase
acquire	decrease	indicate	put forward
adapt	define	influence	quantify
add	delay	inhibit	realise
address	demonstrate	initiate	recognise
adjust	derive	insert	recommend
adopt	describe	install	record
affect	design	interpret	reduce
allow	detect	introduce	refine
alter	determine	invert	refute
analyse	develop	investigate	regulate
apply	devise	isolate	reinforce
argue	discard	limit	relate
arise	discover	link	remain
arrange	discuss	locate	remove
assemble	display	maintain	repeat
assess	disprove	manage to	report
assist	distribute	match	represent
associate	divide	maximise	resolve
assume	drop	measure	restrict
attach	effect	minimise	retain
attempt	elicit	mirror	reveal

avoid	eliminate	miscalculate	review
bring about	employ	misjudge	revise
broaden	enable	misunderstand	rise
calculate	enhance	model	sample
carry out	ensure	modify	score
categorise	establish	monitor	select
cause	estimate	neglect	separate
challenge	evaluate	note	show
change	examine	observe	simulate
choose	exist	obtain	solve
claim	expand	occur	stabilise
classify	expect	offer	state
collect	explain	operate	study
combine	explore	optimise	substitute
compare	expose	originate	succeed
compensate	extend	outline	suggest
compute	extract	outperform	summarise
concentrate	facilitate	overcome	support
conclude	fall	overlook	test
concur	filter	peak	track
conduct	find	perform	transfer
confirm	focus on	permit	treat
connect to	formulate	plot	trigger
consider	generate	point out	undertake
consolidate	give rise to	position	use
construct	guarantee	precede	utilise
contradict	help to	predict	validate
contribute	identify	prefer	vary
control	illustrate	prepare	verify
convert	immerse	present	yield
correlate	implement	prevent	
correspond		produce	

内容索引

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