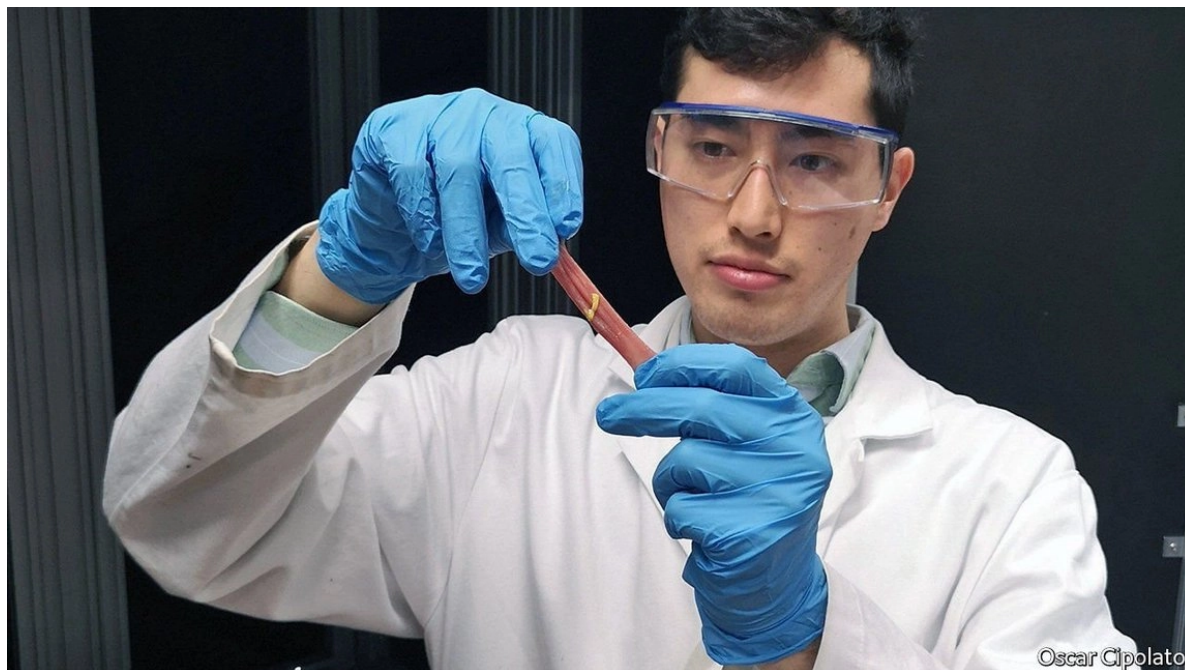


0428 | Never mind stitches—it is possible to solder wounds closed

不用怕缝针了，现在可以焊接伤口

It works exactly the same way that soldering electronics does

其工作原理和钎焊电子器件一模一样



IF YOU CUT yourself, your options are to reach for a **plaster** or, if the cut is **nasty**, to go to a doctor to have it stitched or glued. That seems a rather limited choice. Medical researchers have been trying to develop another way to join the edges of a wound, inspired by something routinely done to gas pipes and electronics: soldering. And an innovation developed at the Swiss Federal Institute of Technology (ETH) in Zurich, in co-operation with the Swiss materials-science institute Empa, suggests this might soon become a practical reality.

如果你被割伤了，一般会找张创可贴，如果伤口比较严重，就去找医生给你缝合或粘合。选择似乎不多。医学研究人员正在尝试开发另一种闭合伤口的方法，这种方法已广泛应用于燃气管道和电子器件，那就是钎焊。位于苏黎世的瑞士联邦理工学院（Swiss Federal Institute of Technology，简称ETH）与瑞士联邦材料科学与技术研究所（Empa）合作研发的一项创新表明，这可能很快会变得现实可行。

In **soldering**, an **intermediate** material is heated until it melts and bonds with the two surfaces that are to be joined. The material of these edges has a higher melting point and remains solid (otherwise it would count as **welding**).

钎焊的原理是加热中间材料使其熔化，与要连接的两个表面结合。这些表面材料的熔点较高，在加热时保持固体状态（否则就是熔焊了）。

For tissue , the intermediate material is not a metal alloy , but a paste of **biocompatible** material , such as **albumin** , a protein that is an important constituent of blood . When heated , the paste develops chemical bonds with living tissue on both sides . As healing progresses , the two sides reconnect and the paste is removed by the body's natural cleaning procedures .

在人体组织上，所用的中间材料不是金属合金，而是由生物相容性材料制成的焊膏，例如白蛋白——这种蛋白质是构成血液的重要成分。焊膏加热后，会与两侧的活体组织形成化学结合。随着伤口逐渐愈合，两侧组织将重新连接起来，而焊膏则通过人体的自然净化过程被清除。

Closing wounds by soldering has several important advantages , says Oscar Cipolato , a PhD candidate at ETH , who presented **preliminary** results on April 5th at the Photonics Europe conference in Strasburg , France . The bond it produces is strong and **watertight** , something that cannot be guaranteed with stitches . If a wound is **internal** — after surgery , for instance — a leak could cause an infection .

4月5日，在法国斯特拉斯堡召开的欧洲光子学大会（ Photonics Europe ）上， ETH 的博士生奥斯卡奇波拉托（ Oscar Cipolato ）介绍了初步研究成果，指出通过钎焊闭合伤口有几个重要优点。这种结合方式很固密而不怕水，这是缝合无法保证的。如果伤口深入体内，比如术后伤口，沾水有可能导致感染。

But soldering tissue has turned out to be difficult in practice , which means it is not commonly done . Heating the soldering paste is done by shining a **laser** onto it , from which the paste absorbs energy . But controlling the heating precisely is tricky . The paste needs to reach about 80°C to work . If the temperature is too low , the soldering material will not fully melt and the bond will be weak . But if it is too high , it risks burning the surrounding tissue . Existing attempts at wound - soldering rely on thermal imaging to measure temperature . But that only measures the temperature at the surface of the solder , rather than throughout the material .

但钎焊人体组织实际操作起来难度很大，所以这种方法不常用。加热焊膏需要用激光照射，使焊膏吸收能量。但要精准控制加热并不容易。焊膏需要加热到80°C左右才能发挥作用。如果温度不够，焊膏就不会完全熔化，导致结合力变弱。但如果温度过高，又可能灼伤周围组织。已有的钎焊伤口的尝试使用热成像来测量温度。但这只能测量焊膏的表面温度，而不是它的整体温度。

(注：翻译来源：官网)

Notes

- **solder** /'səʊldə/

n. 焊料,焊锡

vt. & vi. (使)焊接,焊合

近义词:

[n.] alloy, metal

[v.] join, conjoin

习惯用语:

solder joint 软焊接合; 钎焊接头

solder paste 焊膏; 焊锡膏

solder wire 焊丝, 焊锡丝; 钎料丝

I endeavoured to unhasp the casement, but the hook was soldered into the staple.

我试着去打开那窗子, 但窗钩给焊在钩环里了。

- **plaster** /'plɑ:stə/

n. 灰泥; 石膏; 膏药

vt. 涂以灰泥; 敷以膏药; 减轻; 粘贴; 使平服

习惯用语:

in plaster 上石膏

adhesive plaster 橡皮膏

plaster cast 石膏绷带; 石膏模型

She applied the plaster on his shoulder.

她将膏药贴在他的肩膀上。

The plaster is scaling off the wall.

灰泥从墙上剥落。

- **nasty** /'nɑ:sti/

adj. 下流的; 肮脏的; 脾气不好的; 险恶的

n. 令人不快的事物

近义辨析:

dirty: 普通用词, 泛指被玷污或弄脏。

foul: 指由于腐烂、恶臭等造成的不干净, 令人恶心。

nasty: 主要指特别讲究清洁的人感到讨厌的东西。

习惯用语:

nasty smell 难闻的气味; 恶心的气味; 臭味

nasty about it 对某事态度不好

nasty naughty boy 小坏蛋

cheap and nasty 价廉物劣的; 低档的

nasty business 问题多的企业

The joke is a nasty hit at him.

这个玩笑对他而言是个恶毒的讽刺。

- **intermediate** /,Intə'mi:diət/

adj. 中间的; 中级的

习惯用语:

intermediate frequency 中频

intermediate layer 中间层; 过渡层

intermediate water 中层水; 过渡带水; 中间水域

Cyclopropane carbonyl chloride is an important intermediate.
环丙甲酰氯是一种重要的中间体。

- **weld** /weld/

vt. 焊接；使结合；使成整体

vi. 焊牢

n. 焊接；焊接点

习惯用语：

weld seam 焊缝

weld metal 焊缝金属

We were welded into a fighting collective.

我们结成一个战斗集体。

- **biocompatible** /,baɪəʊkəm'pætəbl/

adj. 生物适合的,不会引起排斥的

习惯用语：

biocompatible coral 生物相容性材料

biocompatible polymers 聚合物

biocompatible material 生物相容性材料

Instead of plastic, this printer uses biocompatible titanium powder, which does not trigger rejection.

这台打印机并没有使用塑料，而是使用不会引发排斥反应的钛粉。

- **albumin** /'ælbjʊmɪn/

n. 清蛋白,白蛋白

习惯用语：

serum albumin 血清白蛋白；血清清蛋白

bovine serum albumin 牛血清白蛋白；牛血清清蛋白

human albumin 白蛋白；人血清蛋白

Consequent upon the structural flexibility and the ligand binding, circulating albumin exhibits chemical and physical microheterogeneity.

由于其结构上的易变性和配体结合的不同，循环中的白蛋白表现出化学和物理上的微观不均一性。

- **preliminary** /prɪ'limɪn(ə)rɪ/

adj. 初步的,预备的,开端的

n. 准备工作,初步行动

习惯用语：

preliminary study 初步研究

preliminary analysis 初步分析

preliminary design 初步设计

preliminary stage 初始阶段,初期；原始阶段

A preliminary groundwork must be laid this year.

今年要打好初步基础。

They are taking preliminary steps in preparation for a possible war.

他们正在为应付一场可能的战争做初步的准备。

- **watertight** /'wɔ:tətaɪt/

adj. 不漏水的,水密的

习惯用语:

watertight integrity 水密完整性

watertight compartment 不透水舱; [船] 水密舱

watertight arguments 无懈可击的论点

All double bottom is watertight and oiltight. Compressed air testing and water-pressure tests can be carried out according to the classification society and by Owner's representative.

所有双层底为水密和油密,并应按规范要求由船东代表进行水压或气密试验。

- **internal** /ɪn'tɜ:n(ə)l/

adj. 国内的; 内部的; 内在的

近义辨析:

inner: 含义广泛, 指事物中心或接近中心的部位, 也可指内心隐密的活动。

inside: 多指处于某物内部或靠近内部, 常可与inner换用, 可引申指内幕的, 秘密的。

interior: 指某物的内部, 尤指某物的内侧; 也可指内地的或国内的。

internal: 书面用词, 医学上多用, 指事物的内部, 也可指国内的或内政的。

inward: 指朝着中心或内部方向的, 侧重方向而不是位置; 也可指内心的隐密活动。

习惯用语:

internal control 内部控制; 内控

internal force 内力

internal audit 内部审计, 内部稽核

The reactionary ruling clique was torn by internal strife.

反动统治集团内部勾心斗角,四分五裂。

He is talking to Tom on the internal telephone.

他正在内线电话上与汤姆交谈。

- **laser** /'leɪzə/

n. 激光

习惯用语:

laser beam 激光束

laser welding 激光焊接

Sophisticated laser experiments are performed regularly in the laboratory.

复杂的激光实验定期在实验室举行。

