國 立 中 央 大 學

機械工程研究所

碩/博士論文

模版 ncuthesisCJK 使用說明

An example in LaTeX/XeLaTeX

研究生: 羅吉昌

指導教授: 羅吉昌

共同指導: 甲教授
乙教授

中 華 民 國 一百零二 年 六 月

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(101 年 9 月最新修正版)

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模版 ncuthesisCJK 使用說明

An example in LaTeX/XeLaTeX

中文摘要

關鍵字： 碩博士論文，體裁檔，LaTeX，XeLaTeX

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An example in LaTeX/XeLaTeX

英文摘要

Keywords: Master/Doctorial thesis, Class file, LaTeX, XeLaTeX

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模版 ncuthesisCJK 使用說明

An example in LaTeX/XeLaTeX

謝誌

體裁檔受啓發於兩位英美教授於網路上的文章，並經吾人中文化及適當增修而成。本體裁檔可再增修，複製，直接採用做個人用途，或單位使用，唯不可做商業用途。請尊重上述兩位教授的無私奉獻。

- 感謝TeX/LaTeX網路社群內，龐大的TeX/LaTeX社群及其網頁提供無價資訊。
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- 承蒙太空及遙測研究中心蔡富安老師協助在Ubuntu 12.04上TeXLive-2009測試成功，僅此誌謝。
- 2013/06/13碩士班 葉信麟同學發現目錄頁碼不正確。
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\author	: 作者
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1. Methods

1.1 Laboratory Astrophysics

To study the chemical reactivity in astrophysical environment experimentally, we conducted our experiments in Interstellar photoprocessing system (IPS) (Chen et al. 2014), an ultrahigh vacuum chamber with base pressure 3×10^{-10} torr and 14 K, corresponds to a density of 10^6 cm^{-3}, similar to dense cloud interiors. The system will be introduced in detail in section 2.1.1. To simulate the irradiation in interstellar environments, we use a micro-wave discharge hydrogen lamp (MDHL) and monochromatic extreme-ultraviolet irradiation (EUV) 30.4 nm to irradiate our ice mixtures, and they will be introduced in section 2.2.1 and 2.2.2 respectively. The experimental protocols will be elaborated in section 2.3. In order to better understand the physics behind, some basic theories of Infrared spectroscopy and concepts of chemical kinetics used in data analysis are included in section 2.4 and 2.5 respectively. To demonstrate the ice mixtures in KBOs, we used different configurations of ice mixtures that refers to different sections in chapter 3 and chapter 4.

2. Experimental Results of CH_4 + NH_3 ice mixtures

According to Grundy et al. (2016), CH_4 from Pluto may accumulate by cold-trapping, onto surface of Charon. The amount of CH_4 varies throughout the surface of Charon because it depends on duration of temperature below 25 K. The duration depends on diurnal motion and thermal inertia of Charon. With a tilted axis of 112 degrees to the ecliptic, higher concentration of CH_4 will accumulate at the pole (see chapter 1 for details). Therefore, we investigate different concentrations of CH_4+NH_3 ice mixtures and answer several questions: Will different concentration of CH_4 mix with high concentration of ammonia observed on crater position and throughout the surface of Charon (Grundy et al. 2016) have structure difference in accumulation of tholin? Are there variations of photo-products when concentration of CH_4 differ during warm-up? Since both EUV and VUV irradiation irradiates onto Charon, are there any differences when we change the photon source from VUV to EUV to irradiate the ice mixtures?

The main source to irradiate the dark side of Charon is Lyα reflected by interplanetary medium (Grundy 2016). Other sources such as the energetic ions in solar wind, consists of mainly H^+, He^+, He^{++} and O^{2+} etc are originated from solar corona or IPM. These ions would also reflect solar irradiation to the dark side of Charon. Among these irradiations, we picked He II irradiation because He II is 3 – 20 times more intense then He I during a solar flare. As it varies, it is difficult to estimate the dose onto Charon. Besides, electronic flux is also present in solar wind but it is one order of magnitude lower than proton flux. The flux for energetic electrons observed at the 1 A. U. position is available (http://www.swpc.noaa.gov/products/goes-electron-flux). Although electron flux is much less important than Lyα, and their flux varies, we also compare the electron irradiation experiment done by Kim Kaiser (2011) on CH_4+NH_3 ice mixtures in this chapter.

When Charon is shine by direct sun light, the surface temperature increases and deliver the heat to the poles by conduction. From the model of Grundy et al. (2016), the surface temperature of the pole area would increase to 60 K that the heating rate depends on the thermal conductivity of Charon. To demonstrate the heating process, we warmup our ice mixture with a heating rate 1 K/min and monitor the ice by both QMS and scanning IR spectra with 5 K intervals. We will look into whether there are new species formed during warmup and monitor the gas phase desorption.

Finally, in this chapter, after we focus on the concentration effect of CH_4 on photo-products, photon energy effects, species detected during warmup phases, we present the residues accumulated by irradiating CH_4+NH_3 ice mixtures with different ratios. Since both tholin formed on Titan and Charon has similar colour, we also compare the IR spectra of MDHL, NSRRC with different configurations with the residues on Titan with experiments done by Imanaka et al.

2.1 The concentration effect of CH_4 on production of C_2H_6 and CN^-

We first look into the concentration effects of CH_4 by irradiation by VUV irradiation. Before and after deposition, we scanned an IR spectrum and plotted the absorbance of the ice mixtures. figure 3.1.1 plots the absorbance of the CH_4+NH_3 ice mixtures in different ratios. Due to the ice thickness, the infra-red spectrum of CH_4+NH_3 = 3:2 consist of 900 ML of CH_4 and 600 ML of NH_3 is tilted due to interference. Since the amount of ammonia is fixed (600 ML) in all the ratios, other ratios has less CH_4 and this problem is less serious. This is also not observed in the ice mixtures after irradiation. Using the same reference spectrum, that is the infra-red spectrum recorded before deposition, we plotted the infra-red spectrum of irradiated ice mixture in figure 3.1.2. It shows the absorbance of each ratio after irradiation. We labelled the peaks which we used to calculate the column densities onto the graph. Main products we have detected are C_2H_6, CN^- and C_3H_8. The peak positions with the references are listed at table 3.1.

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[8] Chinese character \cjk within \section{} does not work using pdflatex, + \includegraphics,
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[9] *Page numbers only appear on pages where a chapter starts*,
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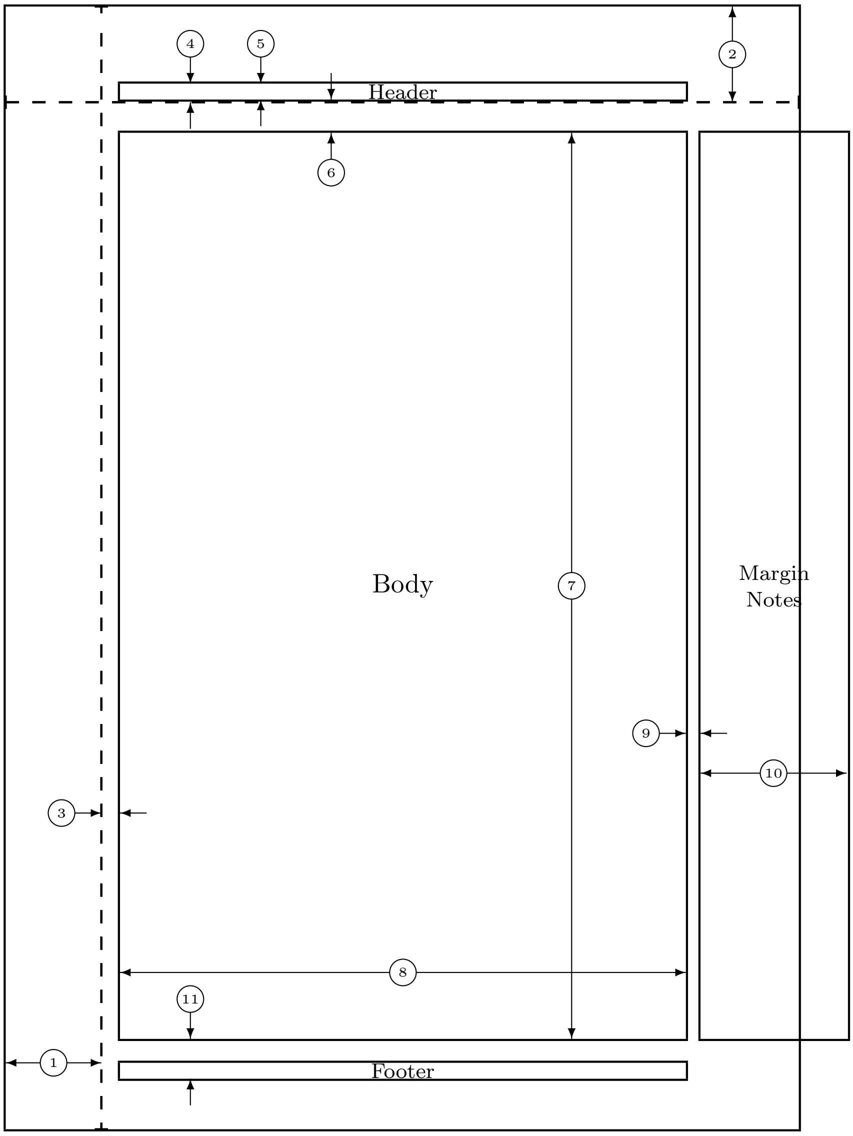

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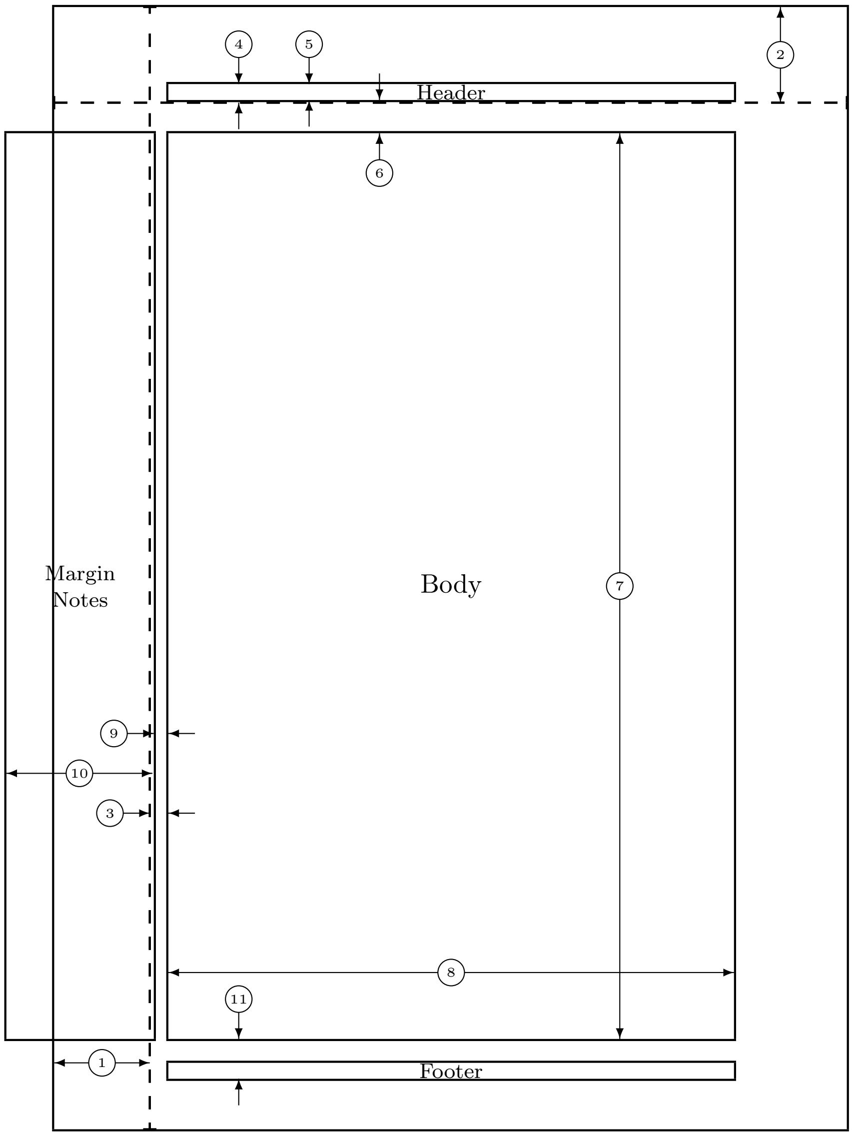

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