2021「中技社科技獎學金」

2021 CTCI Foundation Science and Technology Scholarship

研究獎學金

Research Scholarship

光脫附機制之探討

Investigation of photodesorption mechanism

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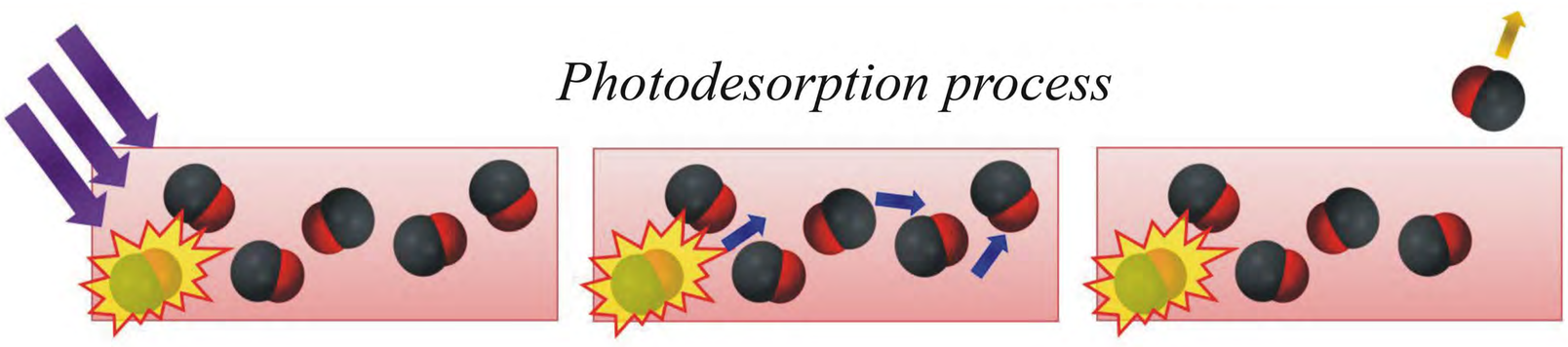
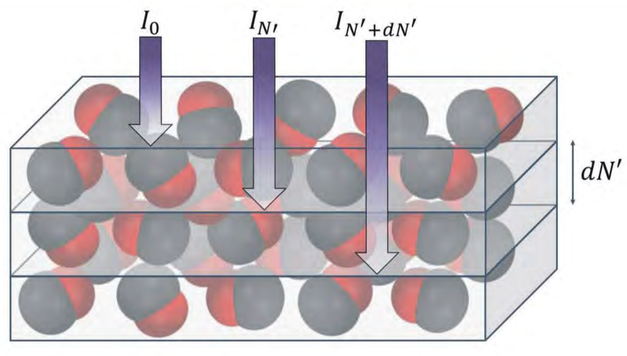
指導教授：陳俞融教授

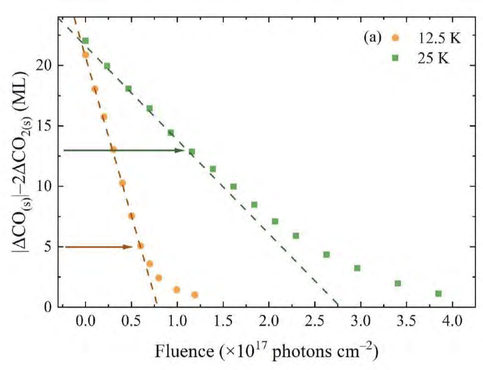
研究重點

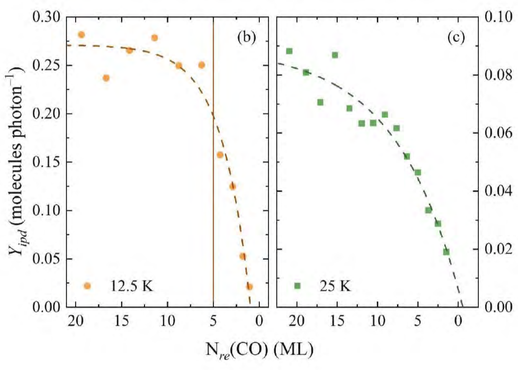
The overabundance of gas molecules in the coldest regions of space point to a non-thermal desorption process. Laboratory simulations show an efficient desorption of CO ice exposed to ultraviolet radiation, known as photodesorption, which decreases for increasing ice deposition temperature. However, the understanding of this abnormal phenomenon has remained elusive. In this work, a dramatic drop in the photodesorption yield is observed when the deposition temperature is 19 K and higher. Also the minimum ice thickness that accounts for a constant photodesorption yield of CO ice is deposition temperature dependent, an observation reported here for the first time. We propose that the key parameters that dominate the absorbed photon energy transfer in CO ice, and contribute to the measured photodesorption yields are the energy transfer length, single ice layer contributed desorption yield, and interface expansion area ratio. This set of parameters should be incorporated in astrophysical models that simulate photodesorption of the top CO-rich ice layer on icy dust populations with the size distribution which is ice thickness related.

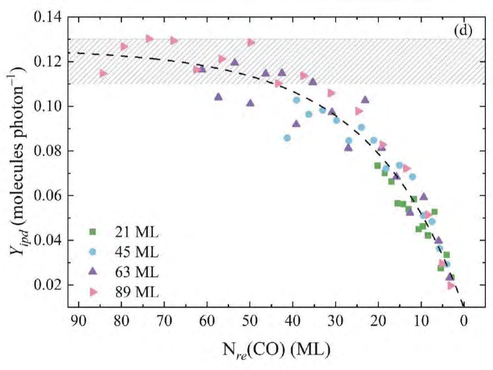
研究重點





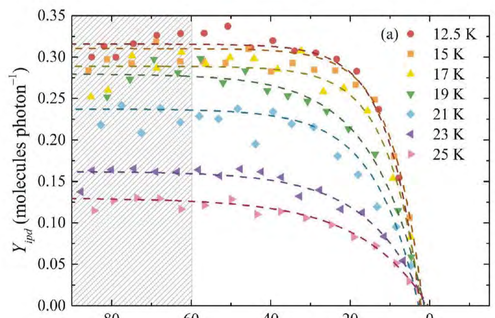


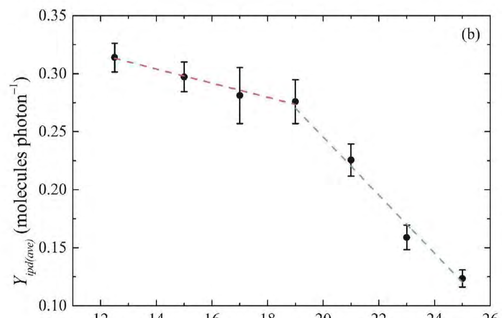


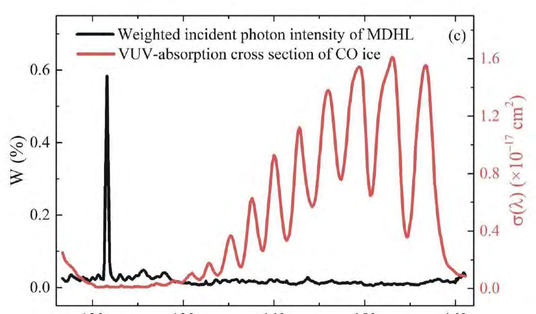


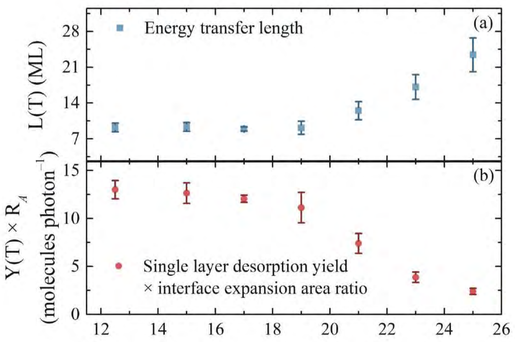
$$Y_{ipd}(T) = \int_0^N -\frac{dI_{N'(\lambda,N)}}{dN'} \times e^{\frac{-N'}{L(T)}} \times Y(T) \times R_A dN'$$

- $Y_{ipd}(T)$: instantaneous photodesorption yield
- N: column density of CO ice (ML)
- $L(T)$: energy transfer length (ML)
- $Y(T)$: single ice layer contributed desorption yield (molecules photon^{-1})
- R_A: interface expansion area ratio









研究生活及心得

很榮幸獲得中技社獎學金這份殊榮，謝謝評審委員給予肯定與鼓勵。深刻感謝一路上不斷激勵我、給我許多機會和栽培的指導教授陳俞融老師與千里馬計畫指導教授Dr. G.M. Muñoz Caro，讓我能夠在這條路上繼續努力前進。最後謝謝我的家人成為我的後盾，讓我無憂無慮繼續朝著目標前進，也期許自己能成為對社會有貢獻的人。