第130回触媒化学研究センター談話会

演　題：Interaction between Catalyst Surface and Light observed by STM: TiO_2(110)

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日　時：２００２年１０月２３日（水）
１６：００ー１７：００

会　場：北海道大学理学部　本館
Ｓ－３０２室（3 階）

要　旨：The interaction between a semiconductor surface and light normally triggers electronic transition within the semiconductor, leading to photovoltaic effect as well as photocatalysis. Such electronic transition is commonly understood in terms of a band model, which assumes infinite array of crystallographic lattice points. Thus absorption of a photon with energy above band gap excites an electron from the valence band to conduction band, leaving a hole in the valence band.

On the other hand, catalytic reactions involved in photocatalysis are highly local in nature: some reactant may need particular local arrangements of atoms that are present on the catalyst surface, and others may need particular local electronic states of the surface atoms to provide unique adsorption or reaction sites. In this sense, descriptions of electron excitation and catalysis in photocatalysts may be said at the extreme ends in terms of space.

Despite this gap that exist in between the two descriptions involved in heterogeneous photocatalysis (band model and local catalysis), no efforts to address and bridge this gap are known to the speaker. The present talk will examine what happens on TiO_2(110) surface upon light illumination at atomic level by means of scanning tunneling microscopy (STM). Main topics are: (1) surface defect production upon light irradiation, (2) microscopic distribution of photoexcited states on TiO_2(110), and (3) nanoscopic distribution of photoexcited states on TiO_2(110).

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