TECHNISCHE UNIVERSITÄT WIEN
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IAP-SEMINAR

EINLADUNG

Termin: **Mittwoch, 15.10.2014 um 16:00 Uhr**

Ort: **Technische Universität Wien,**
Institut für Angewandte Physik,
Seminarraum 134, Turm B (gelbe Leitfarbe), 5. OG
1040 Wien, Wiedner Hauptstraße 8-10

Vortragender: **Prof. Katsuyuki Fukutani**
Institute of Industrial Science, University of Tokyo/Japan

Thema: **Adsorption, absorption and reaction of hydrogen at Pd-based alloy surfaces**

Kurzfassung

Hydrogen is a clean energy source, and hydrogen generation, storage and utilization are of crucial importance in our future society. Since solid surfaces play important roles in these processes, our group has focused on the studies of hydrogen interaction with metal and metal oxide surfaces. For this purpose, we have developed nuclear reaction analysis (NRA) that allows for high-resolution depth profiling of hydrogen and resonance-enhanced multiphoton ionization (REMPI).
Pd is a typical material that absorbs hydrogen in its bulk, and hydrogen absorbed in Pd clusters was shown to play an essential role in olefin hydrogenation reactions. On the other hand, alloying with Au has been claimed to enhance hydrogen absorption in Pd. By combining NRA and TPD, we have studied absorption of hydrogen in Pd(110) and $Pd_{70}Au_{30}$(110), and shown that hydrogen can be efficiently absorbed in $Pd_{70}Au_{30}$(110). When CO is coadsorbed on these surfaces, furthermore, it was found that CO blocks the entrance/exit site of hydrogen at $Pd_{70}Au_{30}$(110) acting as a molecular cap. We also investigated the effects of absorbed hydrogen on the reactions of butene (C_4H_8) adsorbed on these surfaces. Whereas coadsorption of C_4H_8 with surface H on Pd(110) revealed no hydrogenation reaction, hydrogenated products of C_4H_{10} were clearly observed in presence of H in the absorbed state. When C_4H_8 was adsorbed on the D-absorbed $Pd_{70}Au_{30}$(110) surface, on the other hand, TDS showed no hydrogenated products of C_4H_{10}, which is in contrast with the Pd(110) surface. Instead of the hydrogenation reaction, H-D exchange reactions were clearly observed. We discuss the reaction mechanisms on these two surfaces.

Alle interessierten Kolleginnen und Kollegen sind zu diesem Seminar
(45 min mit anschließender gemeinsamer Diskussion) herzlich eingeladen.

U. Diebold e.h.
(Seminar-Chairperson)

H. Störi e.h.
(LVA-Leiter)