TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

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# IAP-SEMINAR

## EINLADUNG

Termin: **Dienstag, 8.10.2013 um 16:00 Uhr**
Ort: **Technische Universität Wien,**
**Institut für Angewandte Physik,**
Seminarraum 134A, Turm B (gelbe Leitfarbe), 5. OG
1040 Wien, Wiedner Hauptstraße 8-10

Vortragender: **Christopher Kley**
Max-Planck-Institute for Solid State Research, Stuttgart/D

Thema: **Atomic-scale observation of multi-conformational binding and energy level alignment of ruthenium-based photosensitizers on $TiO_2$ anatase**

### Kurzfassung

Dye-sensitized solar cells (DSSCs) constitute a promising approach to sustainable and low-cost solar energy conversion. Their overall efficiency crucially depends on the effective coupling of the photosensitizers to the photoelectrode and the details of the dye's energy levels at the interface.
Despite great efforts, the specific binding of prototypical ruthenium-based dyes to $TiO_2$, their potential supramolecular interaction, and the interrelation between adsorption geometry and electron injection efficiency lack experimental evidence. In this talk, I will present our latest results on the observation of multi-conformational adsorption and energy level alignment of single N3 dyes (cisbis(isothiocyanato)bis(2,2'-bipyridyl-4,4'-dicarboxylato)-ruthenium(II)) on $TiO_2$ anatase (101). In situ electrospray ionization deposition combined with scanning tunnelling microscopy and spectroscopy studies in ultra high vacuum at low temperature provide direct access to the dye-substrate interface at the atomic level. The distinctly bound molecules show significant variations of their excited state levels associated with different driving forces for photoelectron injection. These findings emphasize the critical role of the interfacial coupling and suggest that further designs of dye-sensitized solar cells should target a higher selectivity in the dye-substrate binding conformations in order to ensure efficient electron injection from all photosensitizers.

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*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)*