



Seminarankündigung

**Dienstag, 15. Oktober 2013
15:00 Uhr**

WSI, Seminarraum S 101

“Study of hydrogen and electricity production using photo-fuel-cells”

Photo-fuel-cells (PFCs) are photoelectrochemical cells, which can consume a fuel and photons in the presence of photocatalysts and produce a usable form of energy, for example electricity or hydrogen. In a desirable situation, photons will come from Solar radiation while the fuel can be a material in excess, an organic waste or a pollutant. Thus PFCs are devices that create a double environmental benefit, they are renewable resources with capacity of consuming waste material. Water splitting is in fact one of the applications of PFCs since water may play the role of a fuel. Like any other photoelectrochemical cell, PFCs, consist of an anode electrode carrying a photocatalyst, a cathode electrode, carrying an electrocatalyst and an electrolyte. The photoanode absorbs photons generating electrons and holes. Holes are consumed by oxidizing the fuel. Electrons flow through the external circuit producing electricity. When they arrive at the cathode they carry out reduction reactions. One such reaction can take place under anaerobic conditions leading to hydrogen production. This configuration has not changed since the original works more than forty years ago. Most of the research being carried out on PFCs nowadays is a search for novel materials to make functional, efficient and visible-light-responsive photocatalysts and efficient and inexpensive reduction electrocatalysts. Science and technology of nanoparticles has found in the study of PFCs and, more generally, of photoelectrochemical cells, one of the best fields of application. In this presentation, we will discuss our recent studies on photo-fuel-cells and our efforts to incorporate novel mesoporous structures in order to make efficient and low cost cells. In particular, we will discuss the employment of quantum dot sensitizers of nanocrystalline titania as well as the study of new materials, like organic conductors and carbon nanostructures as alternative electrocatalysts substituting for the rare and expensive platinum.

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