

Vortragsankündigung

Dienstag 17. Juli 2018, 17:00 s.t.

Seminarraum I (JAK2AOG1.33), Jakob-Haringer-Straße 2a

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“Transition Metal Oxides Doped with Rare Earth Metal Ions: synthesis, characterization and photoactivity tests”

The application of visible light in photocatalytic reactions is the challenge for scientists in the next years. One possible approach is based on wide band gap semiconductor containing extra electronic levels at intermediate energy in the band gap capable of allowing the transition of electrons from the valence band to the conduction band with a double excitation. With the present contribution, we intended to test the photoactivity of this novel family of materials investigating both zirconium dioxide and zinc oxide doped with lanthanide ions, at various quantitative levels. Firstly, we synthesized and fully characterized via XRD, Diffuse Reflectance UV_Vis and BET the new materials. Secondly we investigated their photoactivity through EPR spectroscopy, generating charge carriers and monitoring their reactivity. This was done in order to verify the potentiality of the novel systems in photocatalytic reactions under low energy photons (i.e. in the absence of UV components) that is essential for future applications under true solar light. In our study we synthesized ZrO_2 and ZnO doped with various Rare Earth (RE= Ce, Pr, Er) ions (0.5-1-5 wt%) and with different techniques. Encouraging results have been obtained especially with the samples containing Ce ions. The photo-formation of both electrons and holes under irradiation with visible light ($\lambda > 420\text{nm}$) has been monitored via EPR. The introduction of new electronic states in high band gap semiconductors leads to new photocatalysts able to absorb some portions of visible light, and to perform, in this way, a classic electron-hole separation.