Česká společnost chemická, pobočka Brno

Vás zve na přednášku, která se koná v místnosti 132, 1.NP, budova A11, Kamenice 5, Přírodovědecké fakulty Masarykovy univerzity, Brno

Ve čtvrtek 6. dubna 2017 v 14:00 hod.

svůj příspěvek přednese:

Prof. Dominic Eder

Design strategies for functional nanocarbon-inorganic hybrid photocatalysts

Institut für Materialchemie, Technische Universität Wien, Vienna, Austria

What are nanocarbon-inorganic hybrids? Hybridising nanocarbon materials, i.e. CNTs and graphene, with active inorganic nanomaterials constitutes a powerful strategy towards designing new-generation functional materials for many applications where efficient charge separation and extraction is required, including photovoltaics, photocatalysis, batteries, supercapacitors and biosensors. In contrast to nanocomposites, which merely combine the intrinsic properties of both compounds, nanocarbon hybrids additionally provide access to both a large *internal active surface area* required for gas/liquid-solid interactions and an *extended interface*, through which charge and energy transfer processes create synergistic effects that result in unique properties and superior performances.

How can they be improved? I will demonstrate that the performance of these hybrids can be further enhanced through purposefully engineering interfaces and morphology, e.g. fewer grain boundaries alleviate electron transport within the catalyst and the formation of an Ohmic junction facilitates charge transfer and charge separation at the interface with the nanocarbon.

How do they function? I will present a model system that allows for measuring and tuning of interfacial charge and energy transfer processes and for revealing the nature of catalytically active sites in nanocarbon hybrids.

How do go on from here? The next aim is to design hybrids with 3D-accessible ordered mesoporous architectures and large pores to eliminate kinetic restrictions imposed by pore diffusion and allow ready gas and liquid access to all active sites. I will show some preliminary results using tailor-made triblock-terpolymers as structure-directing agents and sacrificial templates.

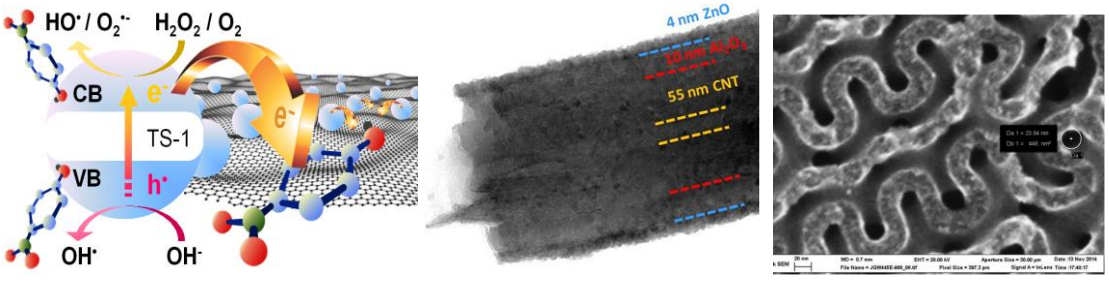

Fig: a) Working princliple of nanocarbon-inorganic hybrid photocatalyst; b) model system with dielectric barrier layer (Al_2O_3) between a photoactive ZnO shell and CNT inner core; b) ordered mesoporous carbon with gyroid architecture.