

**PHYSIKALISCHES KOLLOQUIUM
EINLADUNG**

26.10.2010/Wh

Am Montag, dem 1.11.2010, 16.15 Uhr in W2-1-148

spricht

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über

**“Application Potential of Colloidal Nanocrystals in Environmental Research Fields:
Heterogeneous Gas Phase Catalysis and Photovoltaics”**

Abstract

Nanocrystalline materials with characteristic dimensions below ~10 nm possess a variety of physical and chemical properties which can significantly differ from those of the corresponding bulk materials. In the case of semiconductors, tuneable optical properties due to the quantum size effect which leads to an increasing band gap with decreasing particle size are one of the most impressive examples. But also metals show size-dependent properties, an example being catalytic activity for the oxidation of carbon monoxide by Au nanoparticles which is observed only below a critical size of a few nanometers. Colloidal chemistry offers unique possibilities to prepare small nanocrystals of various materials with highly defined structural properties such as particle size and shape by the use of organic ligands in the synthesis. The ligands, small organic molecules, bind to the nanoparticle surface and have a variety of functions, e.g., preventing agglomeration, providing solubility in colloidal solution and controlling the growth process of the nanocrystals. From the high degree of structure control in combination with the tuneable material properties arise a large number of potential applications. In view of the world-wide growing energy demand, the limited resources of fossil fuels, as well as pollution and its consequences, the investigation of advances that nanotechnology might enable for the protection of the environment can be considered as an extremely important area of research. In this context, the work to be presented evaluates the application potential of colloidal nanocrystals with well-defined structural properties in two subfields of environmental research: environmentally relevant reactions in heterogeneous gas phase catalysis and hybrid photovoltaics as an alternative energy concept.

Einladender: Der Direktor