Institut für Physik

Montanuniversität Leoben

A-8700 LEOBEN, Franz Josef Straße 18, Austria
Tel: +43 3842 402-4601, Fax:+43 3842 402-4602
e-mail: physics@unileoben.ac.at

S E M I N A R
aus
Halbleiterphysik und Nanotechnologie

Di, 21.3.2017, 13:00 Uhr, Hörsaal für Physik

"Thin water films as reactive interfaces for nanomaterials growth"

Univ.-Prof. Dr. Oliver Diwald

Department of Chemistry and Physics of Materials, Universität Salzburg

Thin films of water covering metal oxide nanoparticles can give rise to the spontaneous and spatially controllable growth of hydroxide fibers in the ambient. Knowledge about the nature of the reactive interfaces and the underlying formation mechanisms is key to the rational development of metal oxide nanomaterials and associated microstructures. We used silicon tetrachloride as a water free chlorine ion source for the surface functionalization of MgO nanocubes and explored their subsequent transformation into magnesium oxychloride fibers upon contact with water. Specifically we report on the reactivity of MgO nanocubes and cubes towards water inside the colloidal dispersion or from the gas phase [1] and show how the functionalization process and material dispersion determine the reaction pathway that can lead to very different types of hydroxides.[2] Lessons to be learned from this unique route to utilize reactive interfaces of oxide nanomaterials under ambient conditions can be applied to a variety of microstructural evolution processes[3] that involve high surface area materials and superficial and condensed water acting both as a reactant and as a reaction medium.

[1] S.-O. Baumann et al. Langmuir, 2015, 31, 2770-2776.

[2] A. Gheisi et al. RSC Adv., 2015, 5, 82564-82569

[3] D. Thomele et al. Angew. Chem. Int. Ed., 2017, 56, 1407-1410.