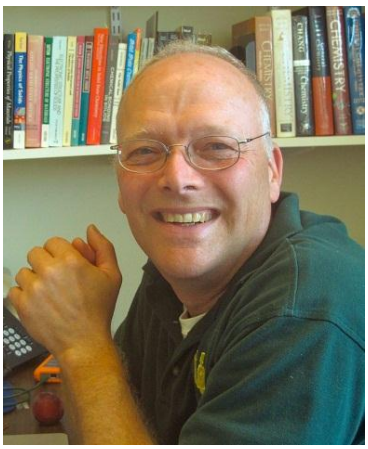
TECHNISCHE UNIVERSITÄT CHEMNITZ

GEMEINSAMES KOLLOQUIUM DER INSTITUTE FÜR PHYSIK UND CHEMIE

Dienstag, 08.04.2014, um **16:15 Uhr**

Ort: TU Chemnitz, Straße der Nationen 62, Raum: 346



Prof. David C. Johnson

University of Oregon
Eugene, Oregon USA

Ferecrystals: New Materials with Designed Nanoarchitecture and Tunable Properties

We have developed a synthetic approach to new materials that uses composition control on an Angstrom length scale to control solid-state reaction pathways, leading to the self-assembly of new nanostructured compounds consisting of two or more compounds with different crystal structures that are interleaved on the nanoscale. By avoiding compounds on equilibrium phase diagrams, we have prepared hundreds of new metastable compounds with designed nanostructure, including structural isomers. Many of these materials have unprecedented physical properties, including the lowest thermal conductivities ever reported for a fully dense solid, systematic structural changes dependent on nanostructure, and unusual electrical behavior. Initially we have focused on intergrowths of 2 dimensional transition metal diselenides, TSe_2, with monoselenides with rock salt structures, MSe to form compounds $[(MSe)_{1+d}]_m(TSe_2)_n$, where d represents the difference in the in plane area per cation between the two structures and m and n are the thickness of the layers within the intergrowth. The ability to prepare entire families of new nanostructured compounds permits a new "thin film metallurgy" or “nanochemistry” in which nanostructure and composition can both be used to tailor physical properties, interfacial structures can be determined for precisely defined constituent thicknesses, and interfacial phenomena and modulation doping can be systematically exploited.

Informationen zum Vortrag erteilt Prof. Dr. Michael Hietschold, Tel.: 0371 531 33203