GDCh

Gesellschaft Deutscher Chemiker

Ortsverband Hannover

Einladung zum GDCh-Colloquium des Ortsverbandes Hannover

Das Colloquium findet um 17h c.t. im Dr.-Oetker-HS (Raum 007, Gebäude 2504) der Leibniz Universität Hannover, Institut für Physikalische Chemie und Elektrochemie, Callinstraße 3a, D-30167 Hannover statt.

11.07.2024 **Prof. Dr. Gunnar Westin**
Uppsala Universität, Schweden

Complex structure and composition oxides through solution processing

Solution based processes have gained much interest for the preparation of complex nano-structured materials. Benefits are found in the often direct and simple processing routes allowing for large-scale technological exploitation of the processes without the use of complex and size and shape limiting vacuum equipment. The solution chemical routes span a wide range of sub-disciplines that have been rapidly developed during the recent decades to produce unique and high quality materials of various shapes and complexities.

The talk will firstly present a short, general description of solution based processing using hetero-metallic alkoxides and inorganic salts complexed with organic groups and the thermal processing taking the precursor molecules into the ceramic target materials. Advantages and challenges with the two precursor systems will be discussed. Then, synthesis and properties of various complex composition and structure oxide systems will be discussed focusing on nano-structured porous sponge or nano-particle based and thin- and ultra-thin systems. A particular focus is paid to the crystal quality, purity and local dopant element distribution which are strongly related to the precursors and processing and which strongly determine the properties. .....The phase development taking place upon heating of gels, powders or liquid precursor concentrates to yield the target products were studied in detail with a wide range of analytical techniques including: TG-DSC, XRD, XPS, IR spectroscopy, EXAFS, ePDF, SEM-EDS, and (S)TEM-ED/EDS/HAADF/EELS. In some cases, DFT calculations were employed to derive plausible complex structures supported by the above experimental techniques.

The examples are chosen to give a general discussion the how the choice of precursors and processing parameters can be used to obtain high quality complex oxides of various micro-structures, as well as target materials with potential for use in sensors, catalysis, solar-cells and fuel generation, photo-active self-cleaning surfaces, optically active materials, and electro- and magnetic thin films.

Prof. Dr. Jens-Uwe Grabow
Vorsitz OV Hannover

Vor dem Colloquium findet ab ca. 16h c.t. eine ‚Kaffeerunde' mit dem Vortragenden in der Bibliothek des PCI statt.