CVD of Laminar Ceramic Composites
Johanna G. M. Becht, Paul J. van der Put and Joop Schoonman, Delft University of Technology, The Netherlands.

Laminar ceramic composites can easily be produced during chemical vapor deposition (CVD) by changing the composition of the reactant gas mixture. Several morphologies can be developed depending on whether the composition is changed instantaneously or gradually. The system TiN/TiB₂ has been selected for detailed study. TiB₂ can be utilized in advanced technologies, but in order to prevent extensive boronation of the substrate during deposition a diffusion barrier is required. TiN is shown to be a good diffusion barrier. Results will be presented of the deposition of TiB₂ on a TiN substrate mimicking the instantaneous change in composition of the gas mixture. Furthermore the codeposition of TiB₂ and TiN will be presented.

Comparative Study of Synthetic Procedures for YBaCuO-Type Oxides

The "ceramic" method and the co-precipitated salts "route" are the more usual preparative procedures to obtain high-Tc superconducting YBaCuO-type oxides. An alternative way to yield complex metal oxides involves the thermal decomposition, at low temperature, of suitable precursors: a) metalloorganic derivatives and b) evaporated inorganic salt solutions. A comparative study dealing with the effects of synthetic way on the microstructure grain morpholcg 1, *activity and critical parameter values, will be discussed in terms of chemical and thermal history of the samples.

Synthetic Pathways to Vanadyl Phosphates
D. Beltrán-Porter, P. Amoros, R. Ibañez, E. Martínez, A. Beltrán-Porter, Univ. de Valencia, Spain, A. Le Bell, G. Perrey, Univ. de Maine, 2nd G. Villeneuve, Univ. of Bordeaux, France.

The α-oxovanadium(V) phosphate VOPO₄·2H₂O may be considered as a chemical precursor of a wide variety of V(IV) compounds having the general stoichiometry [VO]H₃PO₄·yH₂O [II]. By partial recrystallization of the parent V(V) compound, mixed valence phases ₈₈{V(V)₁₋ₓV(IV)ₓO₃]·2·xH₂O (Ι) (↔alkaline ions or metal complexes) can result. Synthetic pathways leading to both materials (Ι) and (ΙI) are presented. Physical properties of several phases are discussed based on a wide set of new structural data.

Electrochemical Reactivity of Ultra-Thin Cyanometallate Films on Electrode Surfaces
Andrew B. Bocarsly, Carmella Luangdilok and Youlin Chen, Princeton University, USA.

Anodization of metal or semiconducting electrodes in the presence of a cyanometallate complex such as ferricyanide leads to the formation of a mixed metal, cyanide bridge, surface complex of the form [M(NC)₄(4-CN)₃L]⁺⁺ (where M represents a metal ion derived from the electrode surface and L is the transition metal found in the cyanometallate reagent). Such species form a polycrystalline, three dimensional polymeric network containing channels into which small cations can be intercalated. The thickness of the surface overlayer can be varied from submonolayer to several hundred layers depending on by reaction times, electrode potential, and derivatizing reagent concentration. The surface confined cyanometallate complexes are found to be electroactive in many cases. Both the thermodynamics and dynamics of these species are found to be a strong function of the morphology and crystal geometry of the surface confined species. Surfaces composed of such cyanometallate overlayers are found to be useful as electrocatalysts and in sensor applications. In general it is found that the interface reactivity can be predicted and controlled by a careful consideration of overlayer organization at the molecular level.

Radiation-Thermal Synthesis in the System MeO-Fe₂O₃ (Me=Ba, Sr)
V. V. Boldyrev, A. P. Voronin, O. S. Gribkov, E. V. Tkachenko, N. L. Akserod and V. L. Auslender, Inst. of Solid State Chemistry, Novosibirsk, USSR.

Synthesis kinetics of some ferrites of strontium and barium in a strong beam of accelerated electrons at 1073-1473 K has been studied. The rate of radiation-thermal synthesis was shown to be essentially greater compared to that under traditional conditions of thermal heating. In this case phase equilibrium in multiphase systems is more quickly obtained. To explain this effect several variants are available.