



Special Seminar

Thursday, November 26th · 4:10PM · Room MCI02
5 King's College Road

Crystal Structure Effects on the Conductivity of Ionic and Protonic Ceramics

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Abstract. In this presentation currently known relationships between crystal structure and ionic and protonic conductivity in ceramics will be reviewed. For fast ionic conductors, a revised understanding on the role of crystal structure modifications (e.g. dopant level, dopant type, lattice expansion, etc.) will be presented and exemplified for the case of doped ceria systems. Applying this revised understanding, our recent work has shown that at intermediate temperatures (400°C to 600°C) both Nd-doped and (Sm,Nd)-double doped ceria exhibit higher grain ionic conductivity than for example Gd-doped ceria; the latter usually taken as the highest ionic conducting ceria. In the area protonic conductors, based on the current understanding of proton conduction mechanisms in oxides and particularly perovskites, the potential of phosphate-based ceramics as intermediate temperature protonic conductors will be discussed. The synthesis and characterization of a family of phosphate compounds ideally suited for systematically testing various crystal structure-proton conductivity relationships will be introduced.

Biosketch. Dr. Juan C. Nino is an associate professor at the University of Florida, investigating fundamental structure-processing-property-performance relationships in energy related materials systems. Current research focus includes optimization and development of materials for: (a) electrolytes and cathodes for solid oxide fuel cells, (b) inert matrix fuels for nuclear reactors, (c) high frequency and high temperature dielectrics, ferroelectrics and piezoelectrics, and (d) organic-inorganic electroactive composites for ultrasound imaging.

All visitors are welcome!