Electrical Properties of Nanostructured Ionic Conductors and Transparent Conducting Oxides

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Research Capabilities:

Synthesis

- Low temperature, low p_{O2}, aqueous, ampoule, and/or solid state synthesis of nanostructured, controlled oxidation state, air unstable, and/or novel oxides

Characterization

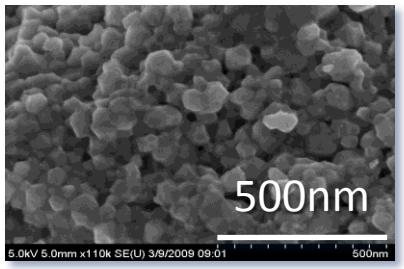
- Electrical (AC-impedance spectroscopy; *in situ* thermopower & conductivity vs. T, p_{O2}; grain boundary properties; dielectric properties) – powders, bulk, thin films
- Structural (XRD+Rietveld, SEM); Chemical (TGA, XPS, XRF, ICP); Optical (diffuse reflectance)

Modeling

- Finite difference modeling of ac electrical properties in pixel-based 3D microstructures
- Thermodynamic modeling of cation distributions in spinels
- nano-Grain Composite Model analysis of grain core/ boundary properties

Materials:

- Interface-dominated/ nanostructured ionic conductors
- Solid oxide fuel cell electrolytes
- Transparent (semi)conducting oxides
- Spinel-structured oxides



Collaborators:

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