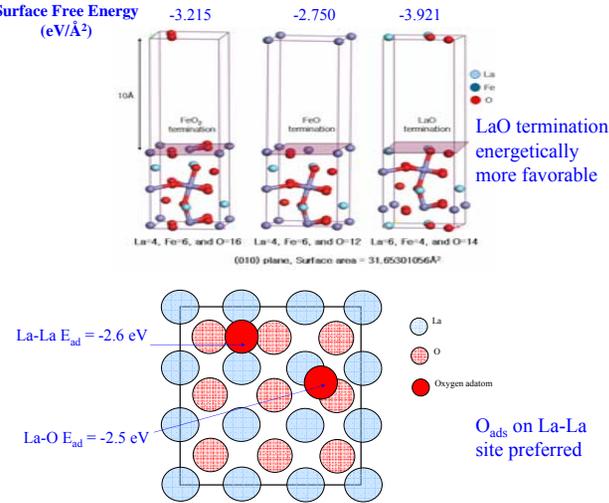




SOFC Cathode Research at the UF-DOE High Temperature Electrochemistry Center

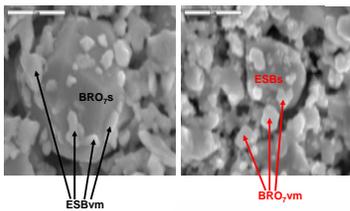
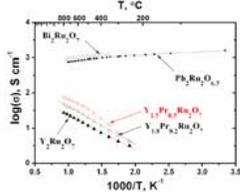


Computational Approach to Developing Fundamental Understanding of Ionic Transport and Heterogeneous Electrocatalysis in SOFCs



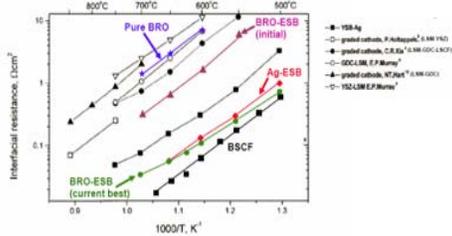
Novel Materials and Microstructures

Ruthenate pyrochlores have high electronic conductivity.

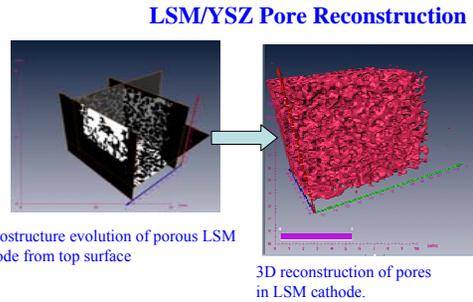


Designing ionic vs. electronic phase microstructure

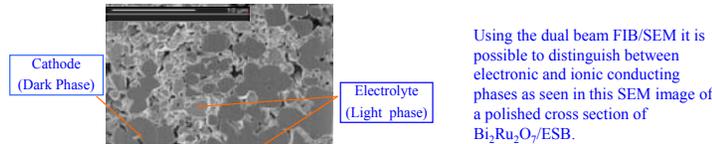
Achieved 0.03 Ωcm^2 ASR at 700°C



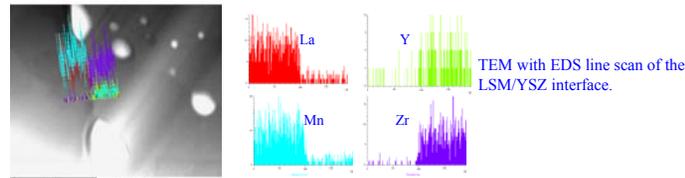
Quantifying Electrode Microstructures by High-Resolution Characterization Techniques



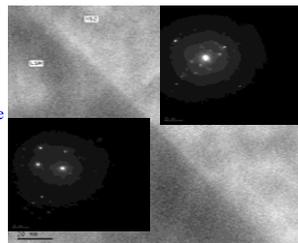
Developing Phase Contrast for Composite Cathodes



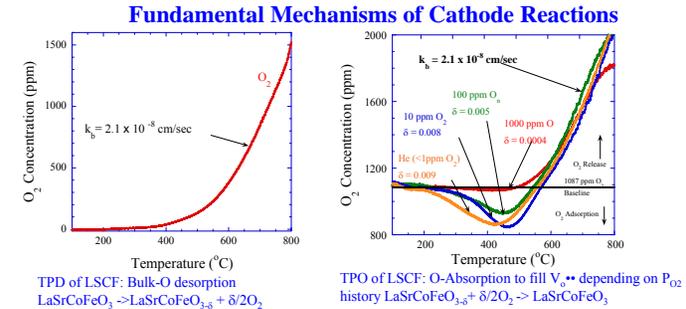
High Resolution LSM/YSZ Interface Analysis



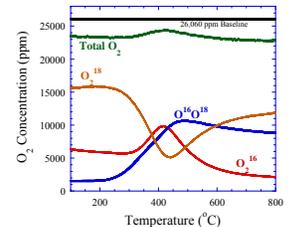
The LSM SAD pattern shows a mixed diffraction pattern. This may be the result of overlapping grains or an indication of an intermediate phase forming at the interface.



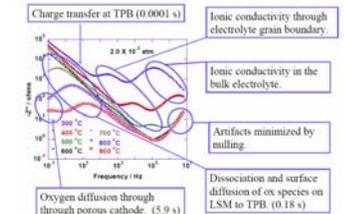
Deconvoluting Contributions to Electrode Polarization



LSCF Isotope exchange elucidates complex mechanism:
 O_2^{18} = gas phase oxygen
 O_2^{16} = lattice oxygen
 $\text{O}^{16}\text{O}^{18}$ = scrambled product due to surface reaction

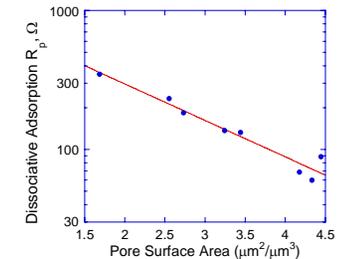
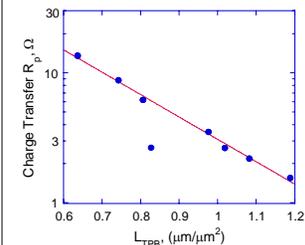


Deconvolution of Impedance Spectra



Relationship Between Impedance and Microstructure

Logarithmic relationship between Dissociative adsorption and pore surface area.



Logarithmic relationship between Charge transfer and L_{TPB} .

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