**DEVELOPMENT OF CERAMIC INTERCONNECT MATERIALS FOR SOFCs**

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**MOTIVATION**
Challenges of Acceptor-doped Lanthanum Chromite
- Inferior Sintering Behavior
- Reactivity with YSZ Electrolyte
(formation of Lanthanum Zirconate)

**GOALS**
Develop Ceramic Interconnect Materials with
- Chemical Stability
- High Electronic Conductivity
- Low Ionic Conductivity
- Improved Sintering Behavior
- Thermal Expansion Match
- Dimensional Stability
- Chemical Compatibility with Other Components
  Through Doping Yttrium Chromite with calcium on A-site and Transition Metals on B-site

**CHEMICAL STABILITY**

**SINTERING BEHAVIOR**
- Measured with Dilatometer
- Co- and Ni-doping improves sinterability.
- Small addition of Cu (~2%) remarkably enhances sinterability.

**MICROSTRUCTURE**
- Cu, Co, and Ni-doping: Open Porosity / Grain Size

**THERMAL EXPANSION**

**OXYGEN PERMEATION**
- Estimated Leakage Current Density < 5 mAlcm²
  (800°C, 10⁻²⁻¹P₀₂=0.21, 20 µm thick Interconnect)

**CHEMICAL EXPANSION**

**ELECTRICAL CONDUCTIVITY**
- Co- and Ni-doping improves conductivity.
- Increase of Charge Density was confirmed by Seebeck measurements.

**POINT DEFECT MODEL**

**SUMMARY**
Calcium- and Transition Metal-doped YCOₓY
- Glycine-Nitrate Process
- Orthorhombic Perovskite Structure
- Cu-doping significantly improves sinterability.
- TEC can be controlled through B-site doping.
- Conductivity is improved by Co- and Ni-doping.
- Ni-doping improves stability toward reduction.
- Oxygen ionic leakage current is sufficiently low.
- Chemically compatible with YSZ, NIO, and LSM.

**FUTURE WORKS**
- Optimize composition of multiple dopants.
- Investigate sintering behavior of thin interconnect on electrolyte and anode.

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