**Title: Bi-Layer p-n Junction Interconnections for Coal-based Solid Oxide Fuel Cells**

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**OBJECTIVE:**
The objectives of this project are:

1) To develop design criteria for a bi-layer interconnection (BLIC) material suitable for use in solid oxide fuel cells (SOFCs).
2) Identify suitable p- and n-type materials for use in the BLIC concept.

**ACCOMPLISHMENTS TO DATE:**

1) Through an analysis of charge and species transport through the BLICs, design criteria have been identified for stable, high performance BLICs.
2) It has been shown that for p- and n-type semiconductors with high electronic conductivities and low level ionic conductivities, the interfacial partial pressure, an important design criterion is dependent on the low level ionic conductivities and not on the electronic conductivities of the layers.
3) Prospective n- and p-type semiconductors have been identified to form BLICs.

**FUTURE WORK:**

1) Measurement of partial conductivities of prospective n- and p-type oxidic semiconductors.
2) Fabrication and testing of lab-scale BLIC structures.

**LIST OF PAPERS PUBLISHED**:

1) "Bi-Layer Structures as SOFC Interconnections" Wenhua Huang and Srikanth Gopalan, (*Accepted for publication in Solid State Ionics).*

**LIST OF PRESENTATIONS:**

1) "Bi-Layer Interconnections for Solid Oxide Fuel Cells" , MRS 2004 Fall Meeting, Symposium K (Solid State Ionic)

**STUDENT SUPPORTED**
Wenhua Huang (doctoral candidate)