

**TITLE:** Carbon-Based Fuel Cell

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#### **ABSTRACT**

**OBJECTIVE(s):** The objective of this study is to develop highly active anode catalysts for oxidation the coke and coal in the solid oxide fuel cell.

#### **ACCOMPLISHMENTS TO DATE:**

- Design and construction of the solid oxide fuel cell.
- Successful test of the solid oxide fuel cell for the direct oxidation of methane.
- Determination of the effectiveness of the use of coal gas as a fuel for the solid oxide fuel cell.
- Test of the solid oxide fuel cell using activated carbon, petroleum coke, and Stockton coal as fuels.

#### **FUTURE WORK:**

- Optimize the performance of the carbon-based fuel cell by adjusting the anode catalyst composition.
- Perform economic analysis of the carbon-based fuel cell.

#### **LIST OF PAPER PUBLISHED, U.S. PATENT/PATENT APPLICATIN(S), CONFERENCE PRESENTATIONS, STUDENTS SUPPORTED UNDER THIS GRANT**

- "Mechanistic Studies of CH<sub>4</sub> Oxidation in the Solid Oxide Fuel Cell," Graduate Seminar, Chemical Engineering, West Virginia University, Oct. 24, 2003.

- “Catalysis of Solid Oxide Fuel Cells,” National Central University, Chungli, Taiwan, Dec. 27, 2004

### **Students Supported Under the Grant**

- James Fisher, M.S. student in the Chemical Engineering Department, The University of Akron.
- Rahul Singh, Ph.D. student in the Chemical Engineering Department, The University of Akron.