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## **Novel Formulations of Sulfur-Tolerant Catalysts and Their Synthesis**

Fuel cells are electrochemical devices that continuously convert chemical energy into electric energy for as long as fuel and oxidant are supplied. Solid oxide fuel cells (SOFCs) are one type of fuel cell and can be fueled by carbon monoxide, natural gas, and other hydrocarbons. The primary advantages of fuel cell power generation include increased efficiency, lower weight and smaller size, less air pollution, and reduced noise. Fuel cells are being considered for use in many different applications. For example, they may be used to power automobiles such as passenger cars and light-duty trucks, and naval vessels including surface ships and submarines. NASA has expressed interest in running Solid Oxide Fuel Cells (SOFCs) on jet fuel reformat for its Uninhabited Aerial Vehicle (UAV) and Low Emission Alternative Power (LEAP) missions, as well as for transatlantic and intercontinental commercial airline flights. The U.S. military is also considering the use of fuel cells that are fueled by jet fuel reformat. The jet fuel is subjected to a reforming process in a fuel processor to produce a hydrogen-rich reformat. However, the natural presence of sulfur in the jet fuel poisons the reforming catalyst used in the reforming process. Also, when sulfur is present in the fuel used in a fuel cell, it poisons the fuel cell anode. Thus, a process has been developed to reduce the poisoning effect on the reforming catalyst while simultaneously increasing hydrogen yields.

The University of Toledo is seeking a company interested in utilizing this technology to substantially improve the jet fuel reforming process by reducing the sulfur levels in jet fuel reformat.

### **Applications:**

1. Jet fuel reforming process to produce a hydrogen-rich reformat
2. Where jet fuel is already onboard the craft

### **Advantages:**

1. Two kinds of sulfur-tolerant catalyst supports
2. Improved sulfur-scavenging compositions for catalysts and sorbents
3. Increased the stability of the catalysts and sorbents
4. Increased hydrogen yields

**This invention is patent pending**

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