



Desulfurizer-Reformer Reactor System for use with Solid Oxide Fuel Cells

Fuel cells are electrochemical devices that continuously convert chemical energy into electric energy for as long as fuel and oxidant are supplied. The primary advantages of fuel cell power generation include increased efficiency, lower weight, smaller size, less air pollution, and reduced noise. Fuel cells are being considered for use in many different applications, and the use of logistic fuels such as diesel and jet fuel is an attractive option for power generation as compared to traditional hydrocarbons. However, diesel fuel is invariably sulfur-laden and when sulfur is present in any fuel that used in a fuel cell, it poisons the fuel cell anode and thereby degrades the performance of the fuel cell. Also, the sulfur present in the fuel poisons the reforming catalyst that is used in the reforming process. The catalyst is poisoned by the organo-sulfur that is invariably present in diesel. This necessitates periodic purging and cleaning, which, being a high temperature energy-intensive oxidative process. In the case of other logistic fuels, such as jet and aviation fuels and coal, sulfur causes deleterious effects towards the reforming catalysts; they are severely poisoned and deactivated by sulfur. Therefore, a method of developing robust sulfur-tolerant reforming catalyst and agile sulfur sorbent formulations for logistic fuels including diesel, coal and, jet and aviation fuels, has been developed.

The University of Toledo is seeking a company interested in utilizing this dual-purpose desulfurizer-reformer reactor system that is useful with solid oxide fuel cells (SOFC).

Applications:

1. Producing ready-to-use Solid Oxide Fuel Cell feed

Advantages:

1. Two-in-one design for simultaneous desulfurization and reforming at the same temperature
2. Produces ready-to use SOFC feed at the operating temperature
3. Provides a clean, sulfur-free, hydrogen-rich feed for the fuel cells
4. Compact and efficient three-chamber design
5. Thermally and microstructurally stable
6. Sulfur-active at high temperatures
7. Does not need regeneration

This invention is patent pending

Contact

The University of Toledo
Office of Research Development
MS 1034
3000 Arlington Avenue
Toledo, Ohio 43614

Phone: 419-383-6965
E-mail: samuel.giles@utoledo.edu

