SOFC REACTION PROCESS SUITABLE FOR USE WITH SULFUR-CONTAINING FUELS

TECHNOLOGY OVERVIEW

The technology is a hybrid process that utilizes both sulfur-tolerant and high power density planar solid fuel cell (PSOFC) stacks to produce power at a higher efficiency. The sulfur-tolerant PSOFC stack uses anode materials that selectively convert Hydrogen Sulphide (H_2S) present in fuel streams to non-poisoning sulfur compounds. The remaining gas balances, which are nearly free of H_2S, are used as fuel inlet to the conventional PSOFC stack. The technology significantly limits the emission of poisonous gases such as NOx and improves the operational efficiency of energy producing plants to provide an environment-friendly solution. It greatly enhances the scope of SOFC to use reformed fuel containing sulfur species as a viable source for energy production. The adjoining figure shows an SOFC test stand.

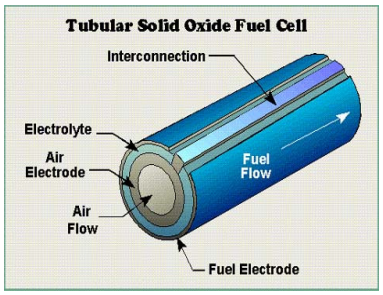
POTENTIAL FIELDS OF USE

The technology has beneficial application in the areas of power generation and fuel cell manufacturing. New-age fuel cells are highly versatile, having residential, industrial, military and transportation applications. The global market for fuel cells is expected to surpass $18.6 billion by 2013. This is accompanied by the global demand for SOFC to reach at least $443 million by 2010, growing at an aggressive annual rate of 22%. These statistics demonstrate a strong market for the technology.

BENEFIT ANALYSIS

The new process has several advantages over existing models:

- Increases the range of fuels such as gasified coal, natural gas and refined hydrocarbons that can be used without the added cost of fuel treatment to remove sulfur components.
- Increases the efficiency of energy production by 20% over coal-fired power plants.
- Enhances the reliability and overall energy efficiency of the process along with lowering electricity transmission costs.
- Reduces environmental impact achieved by substantially reducing CO_2 emission.
- Potential to be developed as a versatile, useful and economical technology.



STAGE OF DEVELOPMENT

The proposed process is in an early phase of development having been subject to a thorough feasibility study. The prototype awaits testing and field-trials to determine the optimum composition of cells used in the PSOFC stack.

FUTURE DEVELOPMENT

The technology has to be tested in order to be evaluated for design optimization and efficiency validation of the process. Viability has to be established on the basis of the reduction in overall infrastructure and implementation costs. Marketability of the final product needs to be evaluated on the basis of overall benefits against investment costs.

LICENSING OPPORTUNITIES

The patent application for this technology has been filed. Licensing opportunities are available.

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