

**PPDO-101**  
**Production of Fuel- Cell Grade Hydrogen by Thermal Swing Sorption Enhanced Reaction (TSSER) Concept, Continuation**

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**Abstract**

A key objective of the nation's drive towards the long term vision of 'Hydrogen Economy' is to develop a small, efficient fuel-cell grade hydrogen (containing < 20 ppm CO) generation unit for residential or industrial use.

This project is designed to develop a novel, step-out, low temperature, steam-methane reforming (SMR) concept [called the "Thermal Swing Sorption Enhanced Reaction (TSSER)" process] for fulfilling that objective. The process is designed to directly produce an essentially CO<sub>x</sub> free stream of H<sub>2</sub> enriched gas (> 90 % H<sub>2</sub>) by reacting steam and methane in presence of an admixture of a catalyst and a CO<sub>2</sub> selective chemisorbent at a much lower temperature (350 -500C) than the conventional (~900C) SMR process in a single unit operation. The chemisorbent (K<sub>2</sub>CO<sub>3</sub> promoted hydrotalcite) has been donated to the Lehigh University by Air Products and Chemicals, Inc., in 2004 for further development of its use.