VI.G.4 Solid State Hydrogen Storage Reduced Infrastructure Requirement Chemistry/Hardware Optimization Study*

Scott Redmond
FuelSell Technologies Inc. (FST)
601 Van Ness Avenue, Suite E3613
San Francisco, CA 94102
Phone: (415) 978-2301; Fax: (415) 276-4165; E-mail: scott@fstenergy.com

DOE Technology Development Manager: Carole Read
Phone: (202) 586-3152; Fax: (202) 586-9811; E-mail: Carole.Read@ee.doe.gov

DOE Project Officer: Paul Bakke
Phone: (303) 275-4916; Fax: (303) 275-4753; E-mail: Paul.Bakke@go.doe.gov

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**Congressionally directed project*

Objectives

- Develop a reversible hydrogen storage medium with at least 5 wt% H_2 recoverable at < 80°C and 1 atm absolute pressure.
- Develop the fundamental and engineering understanding of hydrogen storage by various hydrogen storage media that have the capability of meeting the above storage target.

Approach

FuelSell Technologies, Inc. (FST) seeks to improve methods to store hydrogen in a solid state that safely holds and releases more hydrogen at lower temperatures, in smaller housings, and deliver superior operating efficiencies relative to any other solution. The heart of FST's solution is the integration of an advanced metal hydride chemistry that absorbs hydrogen on a high weight percent basis at ambient temperature and pressure levels combined with a specialized transportable container which increases the efficiency of the chemistry, advances the flexibility and distribution for the use of the hydrogen, and increases the safety of transportable hydrogen. The goals of this work will be to discover and develop processes that conform to DOE's stated goals for storage systems, particularly gravimetric capacity, volumetric capacity and storage system cost.

In addition to improving the ability of our core hydride technology to absorb and release greater amounts of hydrogen, we will seek to improve the efficiencies of the ancillary fuel containers and activation appliances required to release the hydrogen from the metal hydride. FST will perform research with various doping agents in combination with sodium alanate, measure the gravimetric combination of each and select the best one, enhance existing computer models that predict the thermodynamic properties of the compounds to project the charging and discharging kinetics and other chemical properties of the materials, and test and validate the prototype system.

Accomplishments

This project has just been initiated.