



The Realisation of Research

Hydrogen Storage Materials

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Category(s):

Cleantech

Description:

Hydrogen Storage Device

Available for: Hydrogen Storage Device

Summary

Method of chemical hydrogen storage for use in fuel cells.

The Technology and its Advantages

A 'hydrogen economy' has been extensively explored as a route to a more sustainable energy supply than current fossil fuels. Fuel cell technology can be manipulated for use in transportation, portable/battery power and distributed power through stationary fuel cell power plants. The potential for widespread fuel cell use is high however, they require hydrogen as a source of fuel which has its drawbacks. The most technically challenging barrier to its use is its storage, both for economic and safety reasons. The U.S. Department of Energy has laid down a standard for the hydrogen storage capacity in hydrogen powered fuel cell vehicles; volume density of 40kg/m³, mass fraction of 5.5% and hydrogen release at the fuel cell operation temperature of 80-100 degrees celsius. Current technologies in hydrogen storage have struggled to reduce the temperature at which the hydrogen desorbs (.200 degrees celsius).

The technology present in this device provides a solution to these issues. Stabilised ammonia in the form of an ammonium halide is able to store a large quantity of hydrogen. Release of the hydrogen is achieved through milling with a metal hydride at temperatures as low as 60 degrees.

Market Opportunity

There are a range of markets where this technology could be beneficial within fuel cell devices and vehicles. The portable fuel cell market was valued at \$80.1 million in 2008 with a predicted rise in to \$4.4 billion in 2015 (Winter Green Research Inc.) For the potential of this market to be truly realised, energy densities need to increase and working temperatures decreased; both of these challenges are addressed in this novel technology.

Intellectual Property Status

PCT application filed 29 May 2010.

Further Information

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