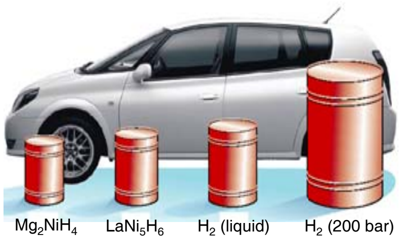
Hydrogen Storage Systems by Proto Systems Ltd

Hydrogen can be stored as a liquid, as a gas or within a material (solid state store).

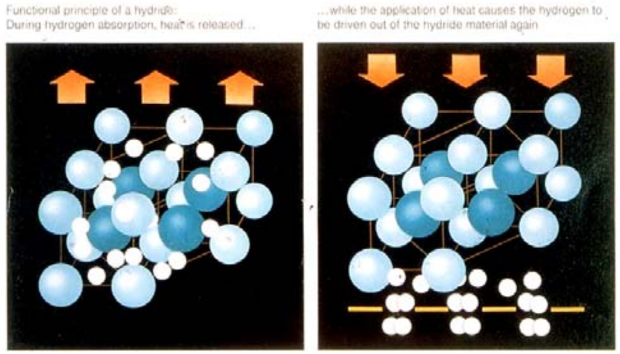
Proto Systems Ltd has developed a range of solid state hydrogen storage systems for small to large scale applications.

The solid state stores have been integrated into fuel cell systems and used to provide hydrogen for research equipment.

Volume of 4 kg of hydrogen compacted in different ways, with size relative to the size of a car.



In a solid state store the hydrogen is contained within metallic granules and powders. Hydrogen is released from the materials when the pressure in the container falls as hydrogen is used by an application (eg- a fuel cell). By storing hydrogen in a solid it is possible to store more gas per unit volume compared to compressed gas and liquid hydrogen tanks.



Solid state stores offer a safe low pressure method for storing hydrogen gas. Even in the extremely unlikely event that the tank suffers from catastrophic failure (for example tank rupture), the hydrogen would still only be released at a slow rate.

The metal hydride vessel shown above will store 400 litres of hydrogen at near atmospheric pressure and temperature. This store will release hydrogen up to a flow rate of 2l/min.

The metal hydride vessels shown above will each store 6000 litres of hydrogen at near atmospheric pressure and temperature. These stores have been used to power a canal boat at the University of Birmingham.

Advantages of solid state hydrogen storage

- *Hydride stores will produce a very high purity gas supply (99.999995% purity).*
- *By storing hydrogen in a metal hydride the amount of gas stored per unit volume can be increased compared to compressed gas and liquid tanks.*
- *Storing hydrogen in a metal hydride is a lot safer than storing it as a gas or liquid as the hydrogen is held at near atmospheric pressure and on tank rupture hydrogen is released at a controlled rate.*
- *The tanks can be filled at low pressure which means that expensive and energy intensive compression and liquefaction processes are not required.*

Proto Systems Ltd has developed a range of solid state hydrogen storage systems for a number of different applications. If you require a store please contact us at sales@protosystems.co.uk

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