

Metallic Hydrides: a Hydrogen Storage Option ?

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Abstract

The development of a safe and efficient way to store hydrogen that may exhibit good gravimetric and volumetric efficiencies is considered instrumental to hydrogen utilization as an alternative to fossil fuels. Furthermore, cost, safety and ease of production must be considered when evaluating storage options. Currently, no available system satisfies the requirements for wide scale acceptance.

Some metallic systems allow reversible absorption/desorption of hydrogen, at temperatures and pressures suitable for practical applications. Currently, metallic hydrides based on intermetallic alloys are the most studied storage options for applications where weight is not an issue, representing more compact systems (by factor of 3x) when compared with high pressure compressed gas.

In this work, the general mechanism of hydrogenation of metallic systems is discussed highlighting the potential for improvements and limitations. Examples of AB₅ and AB type intermetallics will be given.

Research and Development efforts in the field will be also emphasized, regarding the introduction of hydrogen as long-term energy seasonal storage, allowing the match of the primary available energy sources to load demand, in the case of stand alone systems.