OCT 2023/RE/SN-2

TECHFLASH

Fraunhofer

Solid Hydrogen Carriers [SHC]

Metal Hydride Technology for Hydrogen Storage, Purification and Compression Applications : Hydrogen can be safely stored in a very compact form and at low pressure through a chemical reaction with a hydrogen absorbing alloy: A solid metal hydride is formed. Compared to conventional technology, which often uses highly porous hydrides in the form of granules or powders, advanced metal hydride composites consisting of the hydride-forming metal alloy and secondary auxiliary materials such as graphite and/or polymers are used. These secondary materials ensure that the composites can retain their shape as well as increase the reaction kinetics over their lifetime, resulting in greater economy.

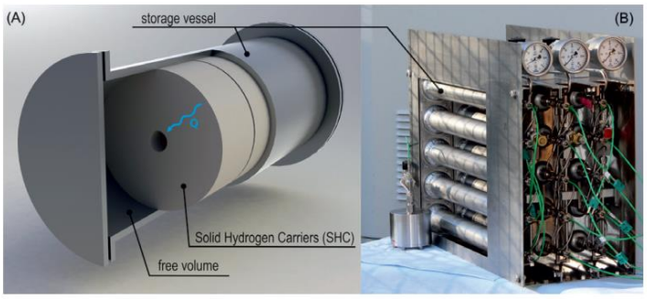

Fig. **A**: Schematic drawing of a SHC storage module.
B: 15-module storage device equipped with temp.

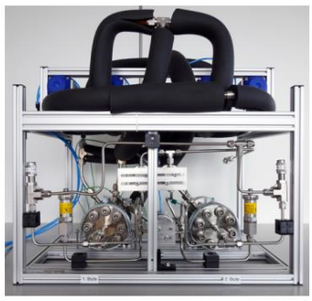

Fig. **C**: Two-stage metal hydride compressor testing unit (max. 200 bar, 400 °C).

Fig. **D**: Metal hydride composites for dynamic sorption processes

Fraunhofer IFAM designs, produces and characterizes hydride forming alloys according to customer requirements using state of-the-art methods. In addition, we provide engineering services for the design, construction, and testing of metal hydride storage tanks and other metal hydride-based systems, including integration into fuel cell power systems.

Applications:

- Hydrogen storage
- Thermochemical hydrogen compression
- Hydrogen purification (7.0 and better)
- Hydrogen separation from gas mixtures
- D2/ H2 separation
- Hydrogen gettering
- Thermochemical devices (heat/cold production in e.g. FC-vehicles)

Metal hydrides for hydrogen storage applications to run wheel loaders, submarines, forklift trucks, railed vehicles, stationary power devices and portable electronics.

Research and Engineering Services at Fraunhofer IFAM

- Metal hydride (MH) development and testing
- Production of MH composites (dynamic hydrogen sorption in minutes
- Development and testing of MH processing technologies.
- Design and construction of MH storage tanks and MH cartridges
- Simulation of hydrogen loading and unloading processes in MH storage tanks
- Reliability tests of MH tanks
- System integration of MH storage tanks
- System development and testing of MH-based devices.

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Thanks and Regards,

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