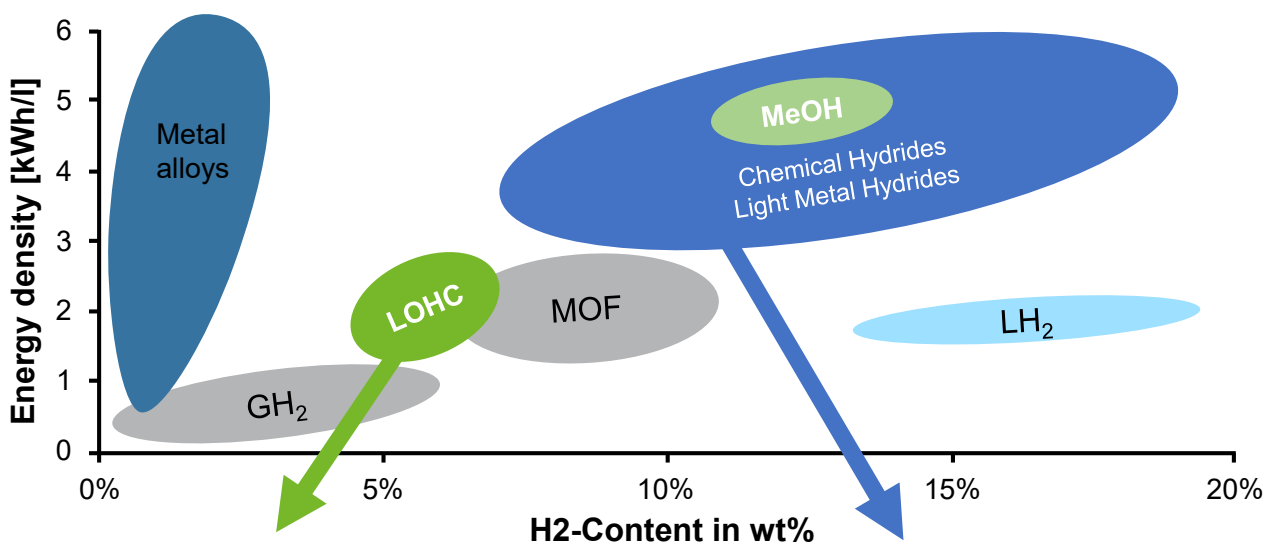


# Solutions for HYDROGEN Transport and Storage

CEA owns a full suite of tools and expertises to develop materials (molecule, catalyst, chemical processes...) and tank /reactor design with LCA / economical assessment to address hydrogen storage issues for any applications: hydrogen transport, stationary storage or mobility.



### Liquid storage using Organic molecules

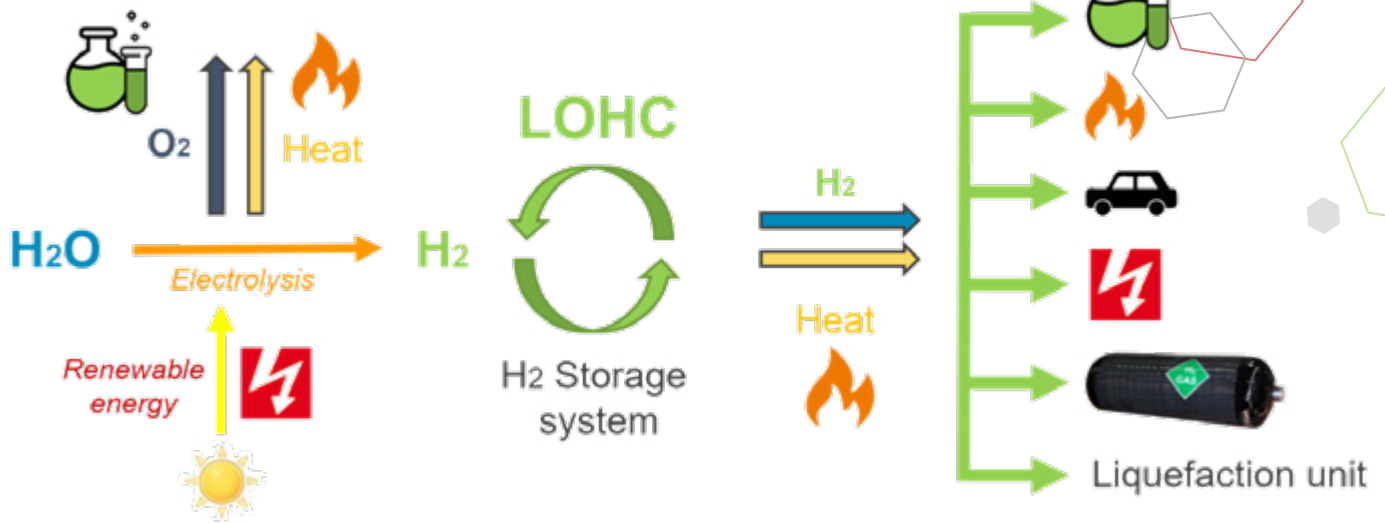
- Liquid, low toxicity, non-explosive
- H2 transport using **existing infrastructures**

### Solid storage using lightweight element B, Mg, Na, N...

- High H2 storage capacity
  - Low energy consumption
- Applications:** niche market

	GH <sub>2</sub>	LH <sub>2</sub>	LOHC	Chemical storage (Hydrides, boranes)
Storage Pressure	700 bar	Atm	Atm	Atm
Storage T (°C)	Room Temperature	-253 °C	Room temperature	Room temperature
TRL	In operation	In operation	Research	Research
Energy density	1,3 kWh /L	2,3 kWh /L	~ 2 kWh /L	3-7 kWh /L
Transport	Special	Special	Standard	Standard
Storage duration	Limited	Limited	Unlimited	Unlimited
Current Issues	Tank lifetime	Boil-off, safety	Energy balance, nber of cycles	Hydride regeneration

- + **Example of a LOHC system and its applications:** Hydrogen mass transport, stationary, storage and mobility



## OUR SKILLS

- + **Development of new hydrogen storage materials:**
  - Novel hydride with high H<sub>2</sub> content (TRL 4)
  - New biobased LOHC molecule with low cost catalyst (TRL 2)
- + **Development of H<sub>2</sub> storage system based on reservoir and/or generator**
  - Implementation of chemical reaction: hydrolysis or thermolysis
  - Process and reactor conception for hydrogenation and dehydrogenation of LOHC
  - Thermal management and fluidics modelling
- + **Large panel of demonstrator realized from portable to stationary applications**
- + **30 Patents portfolio (materials, system, tank...) – several teams and hydrogen platform**
- + **LCA and economical assessment of H<sub>2</sub> chain from production to usage**

**Metal hydride tank**  
designed at CEA TRL 6

