

CHALLENGES FOR HYDROGEN HANDLING

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European and Italian investments plan to support hydrogen as an energy carrier in the energy transition. After production and before the use in different applications, hydrogen may need to be purified, transported, compressed and stored, so suitable hydrogen handling approaches, based on low-cost, safe, highly efficient and sustainable systems and operating close to ambient temperature and pressure, are needed. An overview on the state of the art of current technologies for hydrogen handling will be provided. Some case studies using metal hydrides as hydrogen carrier will be presented. A small scale H₂ refuelling station developed to provide hydrogen for a FC-driven drone will be described. The HyCARE project, funded by FCH JU - H2020 and focussed on the development of an efficient metal hydride-based system for the storage of renewables energies, with a planned quantity of 50 kg of stored hydrogen, will be presented. The Life Cycle Assessment (LCA) methodology to evaluate the environmental impacts associated with developed systems will be shortly described. Finally, main open challenges will be outlined, suggesting possible approaches for their overcoming.



Marcello BARICCO obtained the PhD in Chemistry in 1987. He works for the Department of Chemistry of the University of Torino as full professor in Materials Science and Technology. He has been responsible for the University of Torino in several research projects with European and Italian research institutions and industrial partners (e.g. FLYHY, COSY, BOR4STORE, ECOSTORE). He coordinated the SSH2S European project on hydrogen storage and now he coordinates the EU H2020 project HyCARE, financed by FCH JU. He is an expert in the Task 40 of the IEA-HIA and member of Scientific Committee of FCH-JU. He is coordinator of SP7 on Hydrogen Storage of JP on Fuel Cells and Hydrogen of EERA. The scientific contributions have been presented in about 375 publications in peer refereed national and international journals with about 5600 citations (h-index₃₇). A list of published papers can be found at ORCID: www.orcid.org/0000-0002-2856-9894 or ResearchID: www.researcherid.com/rid/B-4075-2013.