

22nd International Conference on

ADVANCED MATERIALS AND NANOTECHNOLOGY

September 19-21, 2018 Tokyo, Japan

Effect of Nb₂O₅/Ni catalysis on the kinetics behavior of MgH₂ solid-hydrogen storage system**Mohammad Banyan and M Sherif El-Eskandarany**
Kuwait Institute for Scientific Research, Kuwait

In the light of ever-increasing global energy consumption engaged with greenhouse gas emissions, our world faces difficult energy challenges regarding to the fuel sources, climate change and local air pollution. Hydrogen, which holds tremendous promise as a new clean energy option is considered as an efficient source of primary energy. Among the hydrogen economy challenges of production and transportation technologies, hydrogen storage presents the most crucial difficulty restricting utilization of hydrogen energy for real applications. However, Mg metal is the best known cheap solid-state hydrogen storage medium with high hydrogen capacity and operational cost effectiveness; it shows inherent poor hydrogenation/dehydrogenation kinetics and high thermal stability. In the present work, we have succeeded to prepare a new system of nanocrystalline MgH₂ powders doped with a mixture of 8 wt.% Nb₂O₅/2 wt.% Ni powders nanocatalytic agent that possesses superior hydrogenation/dehydrogenation kinetics (2.6/3 min) at relatively low temperature (250 °C) with long cycle-life-time (400 hours). The synthesized nanocomposite powders were consolidated into green-compacts using cold pressing technique. The compacts were utilized as solid-state hydrogen source needed for charging a battery of a cell-phone device, using integrated Ti-tank/commercial Proton Exchange Membrane (PEM) fuel cell system.

Biography

Mohammad Banyan is working as a Research Assistant at the Department of Nanotechnology and Advanced Materials at Kuwait Institute for Scientific Research (KISR). He has completed his Bachelor's degree in Mechanical Engineering from Cleveland State University.

flare7.89@gmail.com

Notes: