Abstract

This chapter discusses about metal hydride technologies for on-board reversible hydrogen storage applications. The metal hydrides such as intermetallic alloys and solid solutions have interstitial vacancies where atomic hydrogen is absorbed via an exothermic reaction; however, by endothermic path, the metal hydride desorbs the hydrogen reversibly at ambient to moderate temperatures. In any case, the hydrogen storage capacity of interstitial metal hydrides is rather low (<2 wt%) due to limitation in the crystal structure and unit cell volume. In order to increase the hydrogen storage densities, transition metal assisted Mg-based hydrides and other nontransition metal complex hydrides have been reviewed as part of exploratory studies which have been aligned with the US Department of Energy 2020 technical targets. A number of useful characterization techniques (X-ray diffraction, scanning electron microscopy, energy dispersive spectroscopy, thermo gravimetric analysis, differential scanning calorimetry, Fourier transform infrared spectroscopy) and hydrogen storage property measurements (kinetics, pressure-composition isotherms, thermal programmed desorption, gas chromatography-mass spectrometry) have been employed for the investigation of some candidate materials.

Citation

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