Abstract

One of the biggest challenges for the commercial application of existing hydrogen storage materials is to meet the desired high volumetric and gravimetric hydrogen storage capacity and the ability to refuel quickly and repetitively as a safe transportation system at moderate temperature and pressure. In this work, we have synthesized polyaniline nanocomposites (PANI-NC) and hypercrosslinked polyaniline (PANI-HYP) materials to provide structure and composition which could meet the specific demands of a practical hydrogen storage system. Hydrogen sorption measurements showed that high surface area porous structure enhanced the storage capacity significantly at 77.3K and latm (i.e., 0.8wt% for PANI-HYP). However at 298K, storage capacity of all samples is less than 0.5wt% at 70 bar. Hydrogen sorption results along with the surface area measurements confirmed that hydrogen storage mechanism predominantly based on physisorption for polyaniline.

Citation

DE Demirocak, S Kuravi, MK Ram, CK Jotshi, SS Srinivasan, A Kumar, DY Goswami & EK Stefanakos, “Investigation of polyaniline nanocomposites and cross-linked polyaniline for hydrogen storage”, 14th International Conference on Advances in Materials & Processing Technologies, Istanbul, Turkey, July 13-16, 2011.