Hydrogen storage in palladium doped MWCNTs produced by incipient wetness impregnation and condensed phase reduction method

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Hydrogen storage properties of palladium doped multiwalled carbon nanotubes have been investigated using the Sievert's volumetric apparatus at ambient temperature. Palladium was embedded into multi-walled carbon nanotube (MWCNTs) by incipient wetness impregnation and condensed phase reduction method. Hydrogen storage studies were performed at the room temperature and equilibrium hydrogen pressures between 0.66 and 1.67 MPa. The maximum reversible hydrogen storage exhibited by palladium-MWCNTs was 0.18 wt% measured at room temperature and equilibrium pressure 1.67 MPa, which is more than two times that of the purified carbon nanotubes. The enhanced hydrogen storage capacity is due to the adsorption of a fraction of hydrogen by the nanoparticles. The Pd-doped MWCNTs also possess a linear dependence of storage capacity on the equilibrium hydrogen partial pressure, which suggests that samples exhibit Henry's type of adsorption characteristics.