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Hydrogen Storage Studies of Palladium-Cobalt alloy nanoparticles dispersed Nitrogen Doped Graphene ASHOK PULLAMSETTY, Research scholar, RAMAPRABHU SUNDARA, Professor — Solid state hydrogen storage has significant importance in the present scenario of depleting conventional energy sources. Recent studies reveal that nanomaterials can play a significant role in the performance enhancement of energy conversion and storage device. Carbon based nanomaterials are considered as suitable candidates for hydrogen storage due to their high porosity, large surface area and high chemical stability. The two dimensional graphene, which has been discovered recently, consists of a single layer of atoms arranged in a honeycomb lattice, exhibits surface area. In the present work, we have been studied the hydrogen storage properties of Palladium-Cobalt alloy nanoparticles dispersed nitrogen doped graphene (Pd_3Co/NG). Graphitic oxide was prepared by Hummers method and mixed with Palladium Cobalt and melamine precursors. The compound was reduced in hydrogen atmosphere at 500 $^{\circ}$C for 5 h. Structural and micro-structural characterization of these samples has been carried out by X-ray diffraction pattern (XRD), Raman spectroscopy, scanning electron microscope (SEM), transmission electron microscopy (TEM) and X-ray photo electro spectroscopy (XPS). The hydrogen adsorption measurements were carried out for NG as well as Pd_3Co/NG at different temperatures (25-100 $^{\circ}$C) and pressures (5-40 bar) using a high pressure Sieverts apparatus. The material Pd_3Co/NG exhibits high storage capacity compared to NG due to spillover mechanism and the results have been discussed.

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