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Hydrogen storage in ZnO-CNF hybrid nanostructures

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Abstract content
   (Max 300 words)
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In this work, we study zinc oxide carbon nanofibers hybrid (ZnO-CNFs) for hydrogen storage. Zinc Oxide thin films have been deposited using DC magnetron sputtering. We have then grown aligned ZnO nanorods on the ZnO thin films, and then synthesis ZnO-CNFs by Chemical vapour deposition (CVD), using acetylene (C₂H₂) as a source of carbon. The characterisation techniques involved in this work are: Scanning electron microscopy (SEM) for the structure and morphology of ZnO nanorods and ZnO-CNFs, energy dispersive X-rays spectroscopy (EDS/EDX) for chemical composition, Atomic force microscopy (AFM) for surface morphology, X-ray diffraction XRD for crystal structure.

Carbon nanofibers have small diameters, a pore-size distribution which leads to excellent adsorption capacity. Elastic Recoil Detection Analysis (ERDA) results are presented and they show promise that these ZnO-CNFs are promising candidates for hydrogen storage. The results show that the temperature has an effect on the amount of hydrogen absorbed, at lower temperatures hydrogen is detected most on the surface and at higher temperatures hydrogen is detected on the surface and on the bulk which yield a higher hydrogen sorption. SEM images shows that the thickness of the ZnO-CNFs decreases with the increase in temperature.

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