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Structural, optical, photoconductivity and humidity sensing properties of biocomposite doped Cobalt oxide

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The Hygrophila spinosa T. Anders plant seeds (HST) possessing gelling behaviour, the mineral constituents of the HST (biocomposite) was doped in Co_3O_4 by using conventional process. The structural parameters, functional groups, surface morphology, elemental analysis and optical behaviour of the prepared samples was made using X-ray diffraction (XRD), Fourier transform-infra red (FT-IR), Scanning electron microscope (SEM), Energy dispersive x-ray analysis (EDX), Diffuse reflectance spectroscopy (DRS) techniques respectively have been studied. The optical characteristic of the prepared samples shows the presence of two peaks at 342 and 652 nm wavelengths confirms the purity of the prepared Co_3O_4. The shift in the wavelength was observed, as the concentration of the biocomposite increased in the Co_3O_4. The humidity sensitivity factor (S_f) of the prepared samples was evaluated by two probe DC-electrical resistance method at different humidity levels. The S_f value determined suggested that CH3 sample (weight ratio of Co_3O_4 : HST biocomposite of 0.25:0.75 respectively) was beneficial for increasing the sensitivity factor possessed relatively a higher value, i.e. 4500. Good linearity, reproducibility, stability and fast response time (5.5 ± 0.25 min) and recovery time (2.5 ± 0.08 min) achieved in CH3 sample is indicative to be a good humidity sensor. The photoconductivity measurement with 100 W tungsten light illumination on the pristine Co_3O_4, HS and doped Co_3O_4 was performed. Photocurrent is found to vary super linearly at high voltage for all the prepared samples. The current–voltage (I – V) curve of the samples gives the photocurrent density larger than the dark current density.

Biography

Udaya Aruldoss has received her Masters degree in chemistry from Anna University, Chennai during 2006. In the year 2007 she completed her M. Phil course in chemistry and later joined as Teaching Research Associate at the department of chemistry at Anna University and continuing till date. She has 1 publication in international journal and 2 patents to her credit. She also presented a research paper in international conference IEEE SENSOR 2011, Limerick, Ireland. Her areas of research include humidity, gas sensors, photocatalysis, nanomaterials and biomaterials.

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