

Electrochemical Synthesis, Characterization and Gas Sensing Properties of Hybrid Ppy/CS Coated ZnO Nanospheres

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Electrochemical deposition method was used to synthesis a new poly-pyrrole (Ppy), zinc oxide (ZnO) nanoparticles (NPs), and chitosan (CS) nanospheres. The Ppy/CS/ZnO film was analyzed for gas sensing properties. The morphology of Ppy/CS/ZnO electrodes was characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM). Chemical compositions of Ppy/CS/ZnO electrodes were characterized by energy dispersive X-ray analysis (EDX). A high selectivity and response towards hydrogen were realized with a ZnO NPs core and chitosan/Ppy shell hybrid nanospheres. Optimum sensing response was achieved with Ppy/CS nanospheres synthesized in the presence of 12 wt% ZnO NPs. The sensing response of fabricated sensor was proportional to the hydrogen gas concentration and exhibited a fast response over a wide dynamic range. The enhanced response originated from the sensing mechanism related with composition and morphology of deposited nanospheres.

Keywords: hybrid core-shell, nanobiocomposite, electrodeposition, hydrogen sensor

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