

Optical and Photo-electrochemical characterization of manganese dioxide/polypyrrole nanocomposite

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Abstract : PPy-coated manganese dioxide (PPy-MnO₂) synthesized by depositing PPy on the surface of γ -MnO₂ particles in acetonitrile solution containing 10⁻¹M lithium perchlorate (LiClO₄) containing a monomer (pyrrole) and semiconductor (MnO₂) nanoparticles. The composite materials (MnO₂-PPy/ITO) were characterized by different methods including cyclic voltammetry, impedance spectroscopy, chronoamperometry, scanning electron microscopy (SEM). The cyclic voltammogram showed one redox couple characteristic of the oxidation and reduction composite material of composite material. The impedance spectroscopy study showed that the resistance of the film increases with the MnO₂ incorporated in the polymer. The morphological analysis of the film surfaces showed that the MnO₂ nanoparticle increased the roughness. These results give information on the use possibility of these materials for energy storage and as photovoltaic cells applications.

Keywords : Manganese dioxide, Polypyrrole, electrodeposition, optical proprieties.