ABSTRACT

Titania has emerged as one of the most promising material for Solar Energy applications. However, the large band gap of titania and massive recombination of photo-generated charge carriers limit its overall photo conversion efficiency which can be overcome by modifying the electronic band structure of titania by doping. In the present work, Ce doped TiO_2 thin films were synthesized using sol-gel method. All the films were characterized by using different techniques such as X-Ray Diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), Photoluminescence (PL) Spectroscopy, UV-vis Diffuse reflectance spectra (UV-DRS). The thin films were prepared on a conductive substrate ITO, the thin films were prepared with varying amount of Ce doping, *viz.* 0.00 Ce doped TiO_2, 0.05 Ce doped TiO_2, 0.50 Ce doped TiO_2, 1.00 Ce doped TiO_2. The thin films on ITO were used for cyclic voltammetry study at different scan rates. From the cyclic voltammograms the electrical properties of the film was analyzed. Cyclic Voltammetry sweep rate dependence determined the electrochemical charge storage. The CV study has shown the variation of charging current, charge storage capacity and capacitance with scan rate in the presence and absence of light. Cyclic Voltammetry scan rate dependence determined the electrochemical charge storage. For photovoltaic applications, the change in band gap, charge storage and capacitance after doping cerium into titania thin films has greater promises for use in solar cell applications.

Key words: *Cyclic Voltammetry, Capacitance, Charge storage, Band gap, Thin film electrode, Solar cells.*