ABSTRACT

TiO_2 nanoparticles with a weight concentration of 1, 2 and 3% have been successfully doped into the ZnO-PVA nanocomposites matrix. SEM, XRD, UV-Vis and IV characterization have been carried out to determine the morphological, crystallinity structure, optical and electrical properties. A thin film of ZnO-PVA and ZnO-PVA-TiO_2 nanocomposites has been successfully deposited on a glass substrate by the spin coating method. SEM characterization showed that there was some heterogenity in the ZnO-PVA and ZnO-PVA-TiO_2 nanocomposites films caused by agglomeration of ZnO and TiO_2 inorganic nanoparticles. XRD characterization revealed the presence of ZnO and TiO_2 crystals in certain orientations on the PVA matrix. UV-Vis characterization showed that the absorbance value of ZnO-PVA nanocomposite was greater than that of ZnO-PVA-TiO_2. However, with the addition of TiO_2 the absorbance value increases, which favors light scattering on the surface roughness and grain boundaries because the particles are evenly distributed on the substrate. All samples of ZnO-PVA and ZnO-PVA-TiO_2 nanocomposites film experienced a red shift towards ultraviolet. Characterization of electrical properties was carried out by I-V measurements, and the results showed that ZnO-PVA and ZnO-PVA-TiO_2 nanocomposites fluctuated. The value of the current flowing is very small, namely 0.235 nA for ZnO-PVA nanocomposite and -0.905 nA for the addition of 3% TiO2 when given a voltage variation of -5V to 5V without the influence of light.

Keywords: I-V, PVA, Spin Coating, TiO_2, UV-Vis, ZnO