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PREPARATION AND CHARACTERIZATION OF SINGLE AND BINARY METAL OXIDE BASED ON ZINC OXIDE FOR SOLAR CELL APPLICATION

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ABSTRACT
Single and binary metal oxides ZnO, ZnO-TiO2 and ZnO-RE (rare-earth) thin films for solar cell application were prepared by using dip coating sol-gel technique. In this study, important deposition parameters were thoroughly investigated in order to find appropriate procedures to grow large area thin films of high crystalline and transparency. The content of doping in sols was varied between 5 to 15 at wt percent and annealing temperature was conducted from 300oC to 500oC. The coatings have been characterized by X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), photoluminescence (PL) and diffuse reflectance ultra violet (DRUV). Experimental result indicated that the annealing temperature affected the crystallinity of the thin films. The higher the temperature, the more crystalline oriented is will be. Band gap energy of rare-erath doped ZnO point out the absorption edges moves to the longer wavelength with increasing the amount of doping, simultaneously the optical band gap of films were decreased. From the structural and optical properties, the results point out that rare-earth doped ZnO has high potential in solar cell applications.

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