

Poster Presentations

The optical band gaps and optical constants of non-crystalline WO₃ thin films doped with Ti deposited by dip coating in sol-gel

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Abstract

The optical constants and optical band gaps of the non-crystalline tungsten oxide (WO₃) thin films doped with Ti deposited by dip coating method onto glass substrates with different atomic concentrations of Ti have been investigated by optical characterization method. The amorphous crystal structure of the films when heated to 160 °C was revealed by XRD. The optical data of WO₃ thin film have revealed a direct allowed transition band gap of 3.1 eV, which increases slightly up to 3.6 eV by increasing Ti concentration due to the formation of TiO₂ new phase that may be introduced within the amorphous structure. The effect of Ti concentration on the film thickness and optical constants (refractive index, absorption coefficient and dielectric constants) of these films have been also investigated. The room temperature refractive index, which was calculated from the reflectance and transmittance data, allowed the identification of the dispersion and oscillator energies lattice dielectric constant and static dielectric constant of these films, which show that WO₃ thin films doped with Ti can be used as UV sensors, where 10% Ti doping is the best sensor.