

Concentration Effect of Mixed SnO₂-ZnO on TiO₂ Optical Properties Thin Films prepared by Chemical Spray Pyrolysis Technique

In this work, the concentration effect of mixed tin dioxide and zinc oxide on optical properties of titanium dioxide thin films was studied. Thin films were prepared by using spray chemical pyrolysis technique on glass substrate at 350°C. The optical results revealed a weak optical transmittance for Un-doped TiO₂ at the end of ultraviolet spectrum followed by an increase, more than 48%, at the near IR spectrum. TiO₂ thin films revealed more transparent with blue shift in the absorption edge when the SnO₂-ZnO mixed increased. A significant decrease in the absorption coefficient with increasing the mixed of SnO₂-ZnO. According to the results of the electronic transition of TiO₂, thin films have direct and indirect energy gap, about 3.2 eV and 2.11 eV, respectively. An increase in both types of energy gap was observed with the mixing concentrations of SnO₂-ZnO increase. In addition, a significant decrease also was in the refractive index and extinction coefficient with the increasing SnO₂-ZnO concentration.