

Effect of Ce doped on the structural, optical, electrical and sensing properties of V₂O₅ thin films prepared by chemical spray pyrolysis

V₂O₅ films doped with different cerium concentrations are deposited onto glass, p-type Si (111) and porous silicon

(PS) substrates with temperature of 250 C by chemical spray pyrolysis technique (CSPT). V₂O₅ powder was

dissolved in distilled water to prepare 0.05 M precursor solution. Ce doped vanadium oxide films were prepared,

adding cerium oxide (CeO₂) with the ratios of 0%, 3%, 5%, 7% and 9% in separate solution. XRD analysis revealed

a polycrystalline nature of the orthorhombic structure with the preferred orientation of (010) with nano crystallite

size. Atomic Force Microscope (AFM) showed a good uniformity revealing a uniform growth of the films. The

spectral absorption of the films occurred at the absorption edge of 550 nm. Un-doped V₂O₅ and doped with different

concentration of Ce films have direct allowed transition band gap ranging from 2.2 eV to 2.55 eV according to

dopant ratios of Ce. Electrical conductivity and

Hall effect was studied to determine the type of prepared films. Sensitivity of NO₂ and H₂ gas at different doping

ratios and different temperatures was calculated