

ON THE STRUCTURE, ELECTRICAL AND OPTICAL PROPERTIES OF TiO₂ SPUTTERED THIN FILMS

Abstract

Titanium oxide thin films were prepared by sputtering technique onto glass substrates at room temperature (RT). The structure of the films was confirmed using X-ray diffraction (XRD) and revealed the stoichiometry with an O and Ti ratio of 2. The deposited films at RT were found to be amorphous and the films annealed at 300 and 400°C for 2 h were crystalline with orthorhombic structure. The lattice constants and grain size of the film are calculated. The electrical resistivity was found to depend on the film thickness and decreased with increasing the film thicknesses. The optical constants of the films such as the refractive index, extinction coefficient, and absorption coefficient were also determined using the optical transmittance measurements, and the results were discussed. The optical band gap varies from 3.2 to 3.5 eV as a function of oxygen/argon ratios.