

Study the Structural Properties of WO₃:Fe Thin Films Elaborated by Spray Pyrolysis Technique at 450 °C

Elaid OUADAH¹, Nasr-Eddine HAMDADOU² and Abdelkader AMMARI^{3*}

¹Laboratory of Micro and Nanophysics (LaMiN), National Polytechnic School of Oran (ENPO) Maurice AUDIN, BP 1523

²Oran, Algeria Laboratory of Micro and Nanophysics (LaMiN), National Polytechnic School of Oran (ENPO) Maurice AUDIN, BP Algeria

³Department of Physics, Faculty of Matterial Science, Ibn-Khaldoun University, Tiaret, Algeria

*Corresponding author

ABSTRACT

In this work, we have deposited Fe-doped WO₃ thin films using the reactive chemical spray in liquid phase technique (spray pyrolysis) from an aqueous solution based on ammonium tungstate (NH₄)₁₀H₂(W₂O₇)₆ at a concentration of 0.005M on glass substrates heated to a fixed temperature of 350°C. The obtained thin films were heat-treated at 450 °C for 4 hours. Our objective is to study the influence of doping on the morphological and structural properties of these films. The latter have been analyzed by the Dektak XT profilometer and the grazing incidence X-ray diffraction (GIXRD) respectively. Dektak XT analysis revealed that the WO₃:Fe thin film thickness varies between 2362 nm at 3123 nm and increasing in doping can improve the quality of the surface. The XRD analysis shows that the WO₃:Fe thin films obtained by annealing at 450 °C for 4 hours are of polycrystalline nature with monoclinic structures, identified using the JCPDS (Joint Comet of Powder Diffraction Standards) sheet No. 431035. The average grain size was 271 nm, 97 nm and 170 nm for a doping concentration of 1%, 3% and 5%, respectively.

Keywords: WO₃ Thin films, Pyrolysis Spray, heat treatment, Dektak XT profilometer, GIXRD.

