


Turkish Journal of Physics

Turkish Journal

of
Physics

Effective Annealing of ZnO Thin Films Grown by Electrochemical Deposition Technique

Cevdet COŞKUN, Harun GÜNEY, Emre GÜR and Sebahattin TÜZEMEN
Atatürk University, Faculty of Arts and Sciences, Department of Physics
25240 Erzurum-TURKEY
e-mail: emregur@atauni.edu.tr

 [Keywords](#)
[Authors](#)



phys@tubitak.gov.tr

[Scientific Journals Home](#)
[Page](#)

Abstract: Wide and direct band gap ZnO thin films have been grown on conductive indium-tin-oxide (ITO) substrates by electrochemical deposition (ECD) technique using different growth parameters. High quality films in terms of crystallographic and optical characteristics have been obtained under a cathodic potential of -0.9 V; a pH of 5.2, using 0.1 M $Zn(NO_3)_2$ solution. Oxygen gas flow through the solution increased the growth rate and the quality of samples. Subsequent heat treatments at various temperatures for 30 minutes under dry N_2 gas flow show that the most suitable annealing temperature is 300 °C for these electrochemically deposited thin films on ITO. X-ray diffraction (XRD) measurements show that the samples have preferably grown along the direction of (101) and that the annealing at 300 °C caused an increase in the peak intensity belonging the (101) surfaces. The Atomic Force Microscopy (AFM) measurements revealed that the annealing process improved the surface quality of the samples. It has also been observed from the absorption measurements that the band-gap is enhanced from 3.23 to 3.37 eV after this certain heat treatment.

Key Words: ZnO, electrochemical deposition, annealing effect.

Turk. J. Phys., **33**, (2009), 49-56.

Full text: [pdf](#)

Other articles published in the same issue: [Turk. J. Phys..vol.33.iss.1.](#)