

Crystallographic Characterization of ZnO Thin Films by Electron Backscattered Diffraction

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Zinc Oxide, ZnO, has been used in numerous applications [1] as solar cells [2], window material for displays, transparent high power electronics, transducers, piezoelectric, UV light emitters, varistors [3] and acoustic wave devices [4]. The performance of these applications depends on the degree of crystallinity; the crystals have to render a high quality. Preferred orientation or crystallographic texture or has long been known to powerfully influence material properties [5].

The purpose of this work is to show the crystallographic characterization of the ZnO thin films produced by magnetron sputtering. Electron backscattered diffraction (EBSD) has been used to characterize the crystallography of these coatings, deposited on glass. Combined with a Field Emission Gun Scanning Electron Microscope (FEG-SEM), EBSD is a technique that allows the crystallographic study correlated with the surface and chemical properties. Moreover, it enables the analysis of microstructure and texture [6], grain size [7], grain orientation, grain boundary and misorientation [8], phase identification [9] and strain [10].

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Figures:

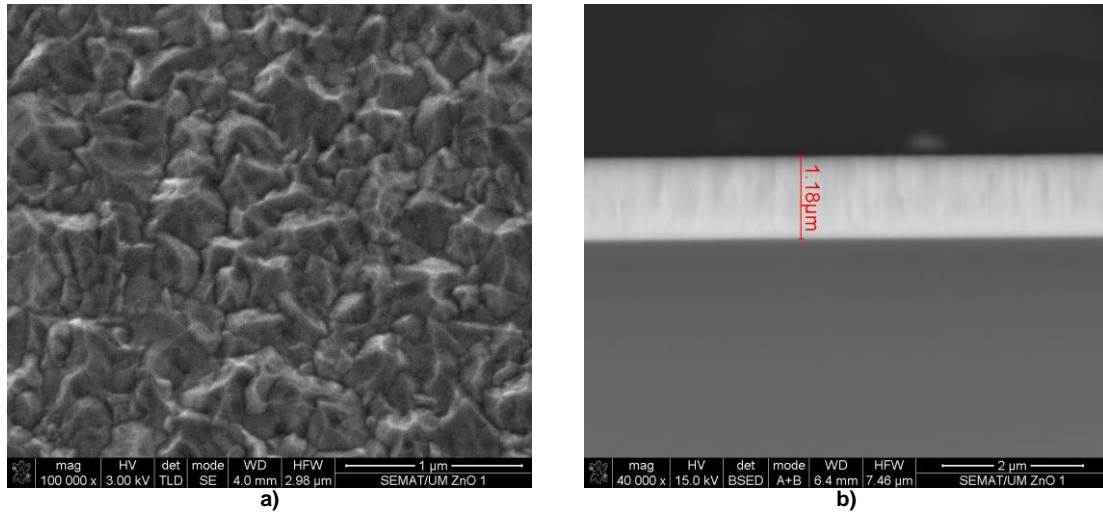


Figure 1 – SEM micrographs of the a) surface morphology and its b) cross-section for a ZnO thin film.

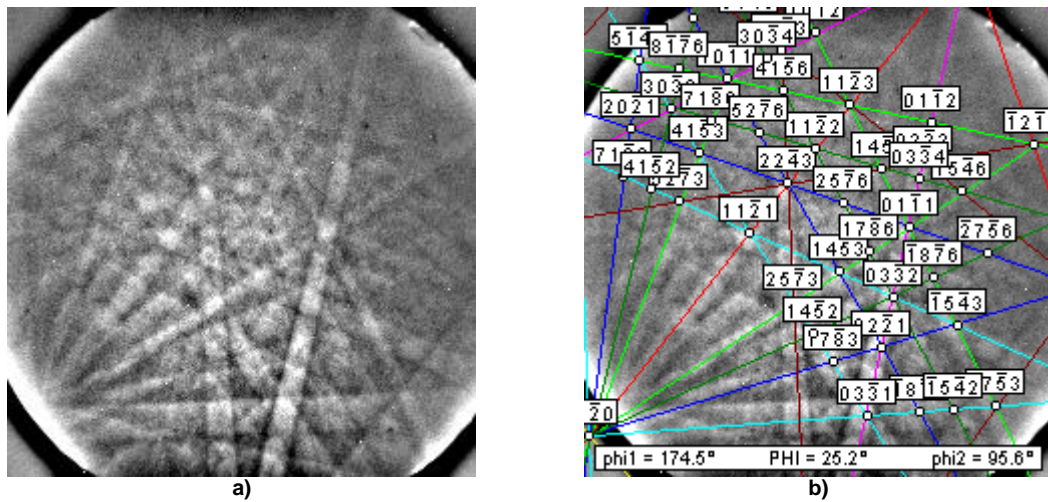


Figure 2 - a) Diffraction Pattern with characteristic Kikuchi Bands and b) respective indexing for a ZnO thin film. The Images were acquired by means of a EBSD detector coupled to a FEG-SEM microscope. Indexing was carried out using the TSL OIM software.

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