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Morphological and Optical Properties of (Al, In) Doped ZnO Thin Films Textured (103) by Sol-Gel Method

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Abstract : To improve the physical properties of ZnO nanostructures textured (103) by sol-gel dip coating method, Al and In are used as dopant with different weight ratios (5%, 10%). The comparative study between Al doped ZnO thin films (AZO) and In doped ZnO (IZO) are made by different analysis technic. XRD showed that the films are Pollycristallins with hexagonal wûrtzite structure and preferred orientation (002) and (103). UV-Vis spectroscopy showed that all films have a high transmission (> 85%); the interference fringes are only observed for IZO. The optical gap is reduced due to the introduction of In (minimum value is 3.12 eV), but increased in the presence of Al (maximum value is 3.34 eV). The thickness of the layers was obtained by modeling (using Forouhi Bloomer method). AFM used to observe the surface texture of the films and determined grain size and surface roughness (RMS) which varies in a small range [3.14 to 1.25] nm.

Keywords : ZnO, optical gap, roughness (RMS), nanostructures
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