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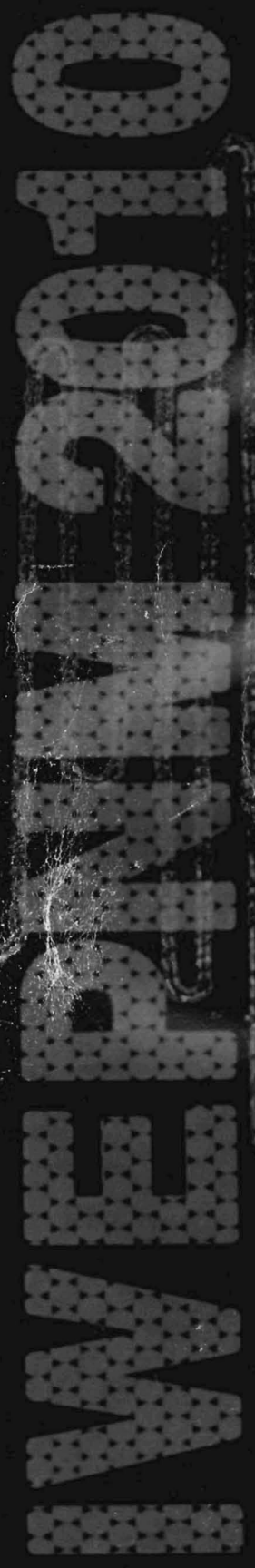
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Al-ion doped ZnO nanothin films: synthesis and characterization

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The versatility of doped and un-doped ZnO in a variety of optoelectronic materials has prompted the extensive research of its morphology-selective synthesis because its properties strongly depend on its microstructure. Al-doped and un-doped ZnO nanothin films on quartz substrate were produced by ultrasonic spray pyrolysis of respected salt solutions (mole concentration of Al within 0-10 per cent). The films were characterized by SEM, XRD, AFM and UV to study its morphology and optical properties. The morphology studies (SEM) showed that ZnO thin films have uniform nanostructural character (size of crystallites well below 100 nm) with the islands of Al-related compounds the surface concentration of which steadily increases with the starting Al content. XRD measurements confirmed ZnO presence on quartz surface. The optical studies revealed that the increase in Al inside ZnO thin layer increases its band gap energy. The obtained value of band gap energy is very close to the determined oscillation energy. However, the dispersion energy is nearly half of band gap energy value. Acknowledgement. This research was partly financed by European Regional Development Fund within the framework of Operational Program Innovative Economy 2007-2013 (No. UDA-POIG.01.03.01-14-071/08-00).