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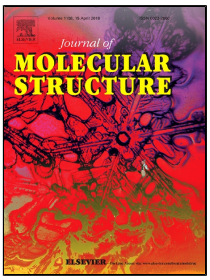

Structural and optical properties of nanocrystalline ZnS and ZnS:Al films

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Structural and optical properties of nanocrystalline ZnS and ZnS:Al films

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Abstract

ZnS and ZnS:Al films have been deposited by ultrasonic spray pyrolysis (USP) method. Three different atomic ratios of aluminium were used as the dopant element. The effects of aluminum incorporation on structural and optical properties of the ZnS films have been investigated. The XRD analysis showed that the cubic structure of the ZnS was not much affected by Al doping. The crystal size of the films decreased, as the Al ratio increased. Al incorporation caused an increase in the intensity of ZnS films' peaks observed in Raman spectra and nearly symmetrical peaks were observed. Al doping caused a small decrease in optical band gap of the ZnS film. The coating of ZnS:Al films on the surface was quite good and there were not any deformation in their crystallization levels. Reflectance values of films are about 5% in the visible region but a little decrease is seen with aluminum doping. We can say that Al doping tends to improve the optical properties of the ZnS:Al films when compared with the undoped ZnS.

Keywords: Al doped ZnS film; XRD; Raman; Optical properties

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