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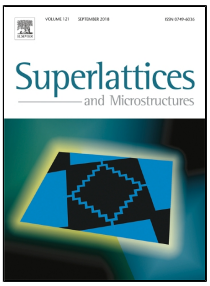

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Abstract

Transparent electrodes made of transparent conductive oxides materials are widely used in optoelectronic devices. The zirconium doped tin oxide films as transparent conductive oxides were prepared by spin-coating technique. The morphology, structure, optical properties and electrical properties of the tin oxide thin films were investigated as a function of zirconium doping concentration. The results show that the films crystallize with a tetragonal rutile structure. And the surfaces of all the films are free of cracks. The average transmittance of the tin oxide films can be reached up to 96% in the visible region by incorporating zirconium, and the optical band gap of samples varies from 3.88 eV to 3.95 eV with the increasing zirconium doping concentration. The tin oxide films with 1 at.% zirconium doping show the lowest resistivity (2.91×10^{-2} Ω·cm) and high carrier concentration (4.39×10^{19} cm^{-3}) with mobility (4.90 cm^2/Vs) via Hall effect measurement system.

Keywords: doped tin oxide; spin-coating technique; structure; morphology; optical properties; electrical properties