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Electrical and Optical Properties of Cu₂ZnSnS₄ Thin Film Prepared by Sol Gel Method without Sulfurization

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Abstract

Cu₂ZnSnS₄ is a technological material with a suitable optical band gap of 1.5 eV and a large absorption coefficient of over 10⁴ cm⁻¹ for low-cost thin film solar cells. We have grown the Cu₂ZnSnS₄ film by sol gel method on glass substrate. The crystal structure and morphology properties of the film were investigated by X-Ray diffraction technique and scanning electron microscopy. The SEM image indicates that the Cu₂ZnSnS₄ film is formed from nanoparticles like prism. The optical band gap E-g of the Cu₂ZnSnS₄ film was determined using the optical absorption method and it was found to be 1.51 eV. The increase in electrical conductivity of the film with increase in temperature confirms that the Cu₂ZnSnS₄ film exhibits the semiconductor behavior. The obtained results suggest that Cu₂ZnSnS₄ thin film can be prepared by sol gel method without sulfurization.

Keywords

Author Keywords: [Cu₂ZnSnS₄ Film](#); [Sol Gel Method](#); [Optical Properties](#)

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