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Influence of substrate temperature on the structural, morphological, optical and electrical properties of copper telluride thin films prepared by electron beam evaporation method

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Abstract

Copper telluride thin films were deposited on the glass substrates at different substrate temperatures viz., Room Temperature, 200, 300, 400 and 500 °C employing electron beam evaporation method. The effect of substrate temperature on the physical properties of copper telluride films was investigated. The X-ray diffraction pattern revealed that the films deposited at 300, 400 and 500 °C are polycrystalline in nature. The crystallite size, dislocation density and microstrain of these films were evaluated. Scanning electron microscopy images showed that the surface morphology of the films is modified by the variation in the substrate temperature. Further variation in the shape, size and distribution of the agglomerated crystallites formed on the surface of the copper telluride films and the roughness of the films were studied as a function of deposition temperature using atomic force microscopy. The direct optical band gap value of copper telluride films varies from 2.45 to 2.93 eV with variation in the substrate temperature. Positive sign of the Hall coefficient

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