

Annealing duration influence on dip-coated CZTS thin films properties obtained by sol-gel method

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Abstract: The effect of annealing duration on structural and optical properties of dip-coated crystalline CZTS thin films was studied. The obtained samples were investigated by several techniques such as XRD, Raman spectroscopy, SEM, UV-vis spectroscopy and Photoluminescence. Being confirmed by Raman spectroscopy, XRD analysis reveals the formation of kesterite tetragonal phase with preferential orientation along (112) direction. The grain size tends to increase as the annealing duration increases, a result confirmed by SEM. The last shows smooth, uniform, homogeneous and densely packed grains. Optical measurement analysis reveals that layers have relatively high absorption coefficient in the visible spectrum with a band gap reduction of 1.62-1.50 eV which is quite close to the optimum value for a solar cell. The photoluminescence distinguishes broad bands that have maximums of intensity limited between 1.50 and 1.62 eV, corresponding to the optical band gap of the CZTS.

Keywords : Kesterite, sol-gel, Thin films, Dip-coating CZTS, Photoluminescence