

SnS_x, Cu₂ZnSnS₄ Nanostructured Thin Layers for Thin-Film Solar Cells

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Abstract : Nanostructured thin films of SnS_x, Cu₂ZnSnS₄ (CZTS) semiconductors were fabricated by chemical processing to produce thin-film photoactive layers for photocells as a prospective lowest-cost and environment-friendly alternative to Si, Cu(In, Ga)Se₂, and other traditional solar cells materials. To produce SnS_x layers, the modified successive ionic layer adsorption and reaction (SILAR) technique were investigated, including successive cyclic dipping into Na₂S solution and SnCl₂, NaCl, triethanolamine solution. To fabricate CZTS layers, the cyclic dipping into CuSO₄ with ZnSO₄, SnCl₂, and Na₂S solutions was used with intermediate rinsing in distilled water. The nano-template aluminum/alumina substrate was used to control deposition processes. Micromorphology and optical characteristics of the fabricated layers have been investigated. Analysis of 2D-like layers deposition features using nano-template substrate is presented, including the effect of nanotips in a template on surface charge redistribution and transport.

Keywords : kesterite, nanotemplate, SILAR, solar cell, tin sulphide

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