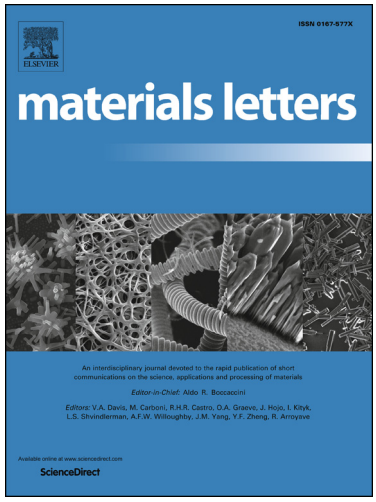

Cu_2ZnSnS_4 thin films by sulfurization in melted sulfur

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Cu_2ZnSnS_4 thin films by sulfurization in melted sulfur

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Abstract

Cu_2ZnSnS_4 (CZTS) thin films were synthesized by sulfurization of subsequently electrochemically deposited Cu/Sn/Zn metal precursors on Mo foil substrates in melted sulfur on air at the temperature of 440 °C close to the sulfur boiling point for 1 hour. The films contain only CZTS phase with lattice parameters a = 5.422 ± 0.002 Å and c = 10.811 ± 0.006 Å and components at. % ratio: Cu/(Sn+Zn) = 1.05, Zn/Sn = 1.22, (Cu+Sn+Zn)/S = 0.93. The film surface is densely packed without cracks or pinholes. The obtained results show the practical ability to obtain CZTS thin films by a novel technically simple and low-cost liquid-based process.

Keywords: Cu_2ZnSnS_4; CZTS; thin films; electrochemical deposition; sulfurization; liquid-based process.