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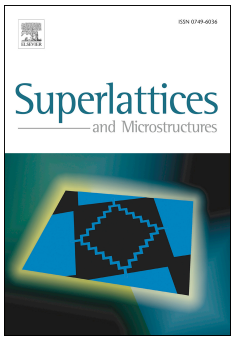

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Effects of annealing processing on the oxide derived $Cu_2ZnSn(S_x, Se_{1-x})_4$ thin films

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Abstract

To reveal the effects of annealing conditions on the formation mechanisms of $Cu_2ZnSn(S_x,Se_{1-x})_4$ (CZTSSe) and the related secondary phases, and improve the crystallization of the films simultaneously, different annealing processing was studied. In this work, the uniform Cu-Zn-Sn oxides precursors have been grown on glass substrates by doctor blade. Whereafter, those precursor films were sulfurized first and then selenized at different temperatures to prepare high-quality pure phase CZTSSe absorber films. The effects of annealing conditions on structural, morphological and