

Abstract Submitted  
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**Phase evolution and microstructure growth of CuInSe<sub>2</sub> by sonochemistry** EMRE YASSITEPE, University of Delaware, WILLIAM N. SHAFARMAN, Institute of Energy Conversion, University of Delaware, S.ISMAT SHAH, University of Delaware — Non toxic chemical routes that enable formation of high quality CuInSe<sub>2</sub> thin films with high materials utilization are desired for low production cost of solar cells. Sonochemistry provides a well known route to form reactive surfaces in metallic particles and, in the literature, CuSe has been reactively formed by using organic precursors. We will present results of the effects of ultrasound on the reactivity between Cu, In and Se elemental particles. The reaction between these elements facilitates binary selenide phase formation which promotes single phase growth of CuInSe<sub>2</sub> with further annealing. XRD analyses showed that binary phases of CuSe<sub>2</sub>, CuSe and In<sub>4</sub>Se<sub>3</sub> are formed by sonication. Annealing these binary phases led to the single phase formation of CuInSe<sub>2</sub> at 350 ° C. We have found that if In has not reacted with Se during sonication, the structure is not completely transformed to CuInSe<sub>2</sub> at 350 ° C.

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