

Synthesis of CIGS powders: transition from binary to quaternary crystalline structure

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CIGS ($\text{CuIn}_x\text{Ga}_{1-x}\text{Se}$) thin film solar cell has been considered to one of the most promising ways to convert sunlight into electrical energy due to its high efficiency as well as high durability. However, the current vacuum based processes have several drawbacks in manufacturing costs as well as efficiency of resource material use. To solve the problems of the current CIGS thin film synthetic methods, non-vacuum processes have been suggested including printing, electroplating, spraying, etc. Herein, we suggested a synthetic method of CIGS powders which will be applied to a paste coating of the CIGS film. Particularly, we focused on the structure changes of CIGS particles during the synthesis where the transition from binary to quaternary crystalline structure was observed. Specifically, the CuSe crystalline structure was initially formed by a solution reaction, followed by the transition to the stoichiometric quaternary crystalline structure of CIGS due to the annealing process. The details of structural characteristics of the powders will be discussed in the presentation.