

Synthesis of $\text{CuIn}_x\text{Ga}_{1-x}(\text{Se}_y\text{S}_{1-y})_2$ thin film by a paste coating

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CIGS thin film solar cell has been considered to one of the most promising way to convert sunlight into electrical energy due to its high efficiency as well as high durability. The obstacles of CIGS solar cell fabrication for commercial applications may be relatively difficult manufacturing synthetic method and high processing costs because it is conventionally fabricated by a vacuum co-evaporation technique. Herein, we suggest a simpler and lower cost synthetic method of CIGS thin film by applying a paste coating. In this method the paste containing Cu, In, Ga, and Se precursor mixture was firstly prepared followed by printing it on glass substrates by a doctor-blade coating. The film was then annealed at two different conditions: a pre-annealing at 250°C in ambient atmosphere and a post-annealing at 500°C in $\text{H}_2\text{S}/\text{Ar}$ atmosphere. The stoichiometric CIGS film was synthesized with the film thickness of $\sim 2\mu\text{m}$. The compositional and structural characteristics of the film were investigated by various analysis techniques including XRD, SEM and EPMA, and will be discussed in the presentation.