

Synthesis of CuInS_2 and $\text{Cu}(\text{In}_x\text{Ga}_{1-x})\text{Se}_2$ nanocrystal inks by a solvothermal route

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Non-vacuum processes such as printing, electroplating and spraying have been suggested to solve the problems of the current vacuum based CIGS solar cell fabrication methods. Particularly, the printing method using a nanocrystal ink would be a most promising one considering manufacturing cost and large panel fabrication. In this study, chalcopyrite copper indium sulfide (CuInS_2) and copper indium gallium selenide ($\text{Cu}(\text{In}_x\text{Ga}_{1-x})\text{Se}_2$) nanocrystals were synthesized by an arrested precipitation in solution. These nanocrystals were then re-dispersed in organic solvent with a suitable viscosity to use as an ink. After drop casting and annealing the film was sulfurized in $\text{H}_2\text{S}/\text{Ar}$ atmosphere. The compositional and structural characteristics of nanocrystals and films were investigated by various analysis techniques including SEM, TEM, XRD, and EPMA, and will be discussed in the presentation.