

## The Role of Annealing Temperature on CuInSe<sub>2</sub> Thin Films as Solar Cell Material

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Investigation on chalcopyrite structures is crucial for making further progress in thin films technology. In this work we present the results on optical, electrical and surface properties of CuInSe<sub>2</sub> ternary compounds thin films with annealing effect. The developed procedure is a two-steps methodology involving the pre-reaction of high purity elements Cu, In, Ga and Se in a carbon coated quartz ampoule and thermal evaporation deposition. The availability of a multicomponent absorber layers such as CIGS, including all elements in a defined ratio, offers the opportunity to reduce film formation temperatures and thereby also reduce manufacturing costs. Optical absorbance is around 70% and optical band gaps are between 1.00 eV–1.2 eV. Also resistivities are 6.04 Ωcm and 2.13x10<sup>1</sup> Ωcm low resistivities for not annealed and annealed samples, respectively. Surface properties verified that as deposited and annealed films showed a smooth, compact, and densely packed morphology. This aspect was a great motivation to evaluate these materials as banauisic and new trend solar cell materials.

**Keywords:** CIGS, PV Materials, SEM, Optical characterization.