

Effects of Annealing Conditions on Characteristics of CuInSe₂ Thin Film synthesized by Continuous Flow Reactor System

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Copper-Indium-Selenium (CuInSe₂) is one of the most attractive materials for the absorber layer in the polycrystalline solar cell because of its high absorption coefficient and non-degradable property. In this study, the polycrystalline CuInSe₂ thin films were prepared by two different solution-based deposition processes, that is, CFR (Continuous Flow Reactor) and CBD (Chemical Bath Deposition). The CuInSe₂ thin film depositions were carried out in the temperature range of 150 ~ 500°C with changing annealing conditions. A series of analysis was performed to investigate their property changes in terms of experimental conditions. X-ray diffraction (XRD) analysis was employed to identify the phases of the obtained thin film. The chemical composition and bonding energy of CuInSe₂ were determined with the aids of X-ray photoelectron spectroscopy (XPS). Transmission electron microscopy (TEM) and Scanning electron microscopy (SEM) were used to provide the detailed information of the particle size and structural information and of the surface morphology, respectively. Energy band gap was estimated by UV-vis spectroscopy measurement.