TF-P018

Effect of the Substrate Temperature on the Characteristics of CIGS Thin Films by RF Magnetron Sputtering Using a $Cu(In_{1-x}Ga_x)Se_2$ Single Target

Sung Hee Jung, Seon Mi Kong, Rong Fan, Chee Won Chung

Department of Chemical Engineering, Inha University

CIGS thin films have received great attention as a promising material for solar cells due to their high absorption coefficient, appropriate bandgap, long-term stability, and low cost production. CIGS thin films are deposited by various methods such as co-evaporation, sputtering, spray pyrolysis and electro-deposition. The deposition technique is one of the most important processes in preparing CIGS thin film solar cells. Among these methods, co-evaporation is one of the best technique for obtaining high quality and stoichiometric CIGS films. However, co-evaporation method is known to be unsuitable for commercialization. The sputtering is known to be very effective and feasible process for mass production. In this study, CIGS thin films have prepared by rf magnetron sputtering using a $Cu(In_{1-x}Ga_x)Se_2$ single quaternary target without post deposition selenization. This process has been examined by the effects of deposition parameters on the structural and compositional properties of the films. In addition, we will explore the influences of substrate temperature and additional annealing treatment after deposition on the characteristics of CIGS thin films. The thickness of CIGS films will be measured by Tencor-P1 profiler. The crystalline properties and surface morphology of the films will be analyzed using X-ray diffraction and scanning electron microscopy, respectively. The optical properties of the films will be determined by UV-Visible spectroscopy. Electrical properties of the films will be measured using van der Pauw geometry and Hall effect measurement at room temperature using indium ohmic contacts.

Keywords: $Cu(In_{1-x}Ga_x)Se_2$, Sputter, Thin film