한국신·재생에너지학회 2009 년도 추계학술대회논문집 pp.400

Effects of substrate temperature on the performance of $Cu_2ZnSnSe_4$ thin film solar cells fabricated by co-evaporation technique

Sunghun Jung[1], Sejin Ahn[1], Jaeho Yun[1], Jihye Gwak[1],
Ara Cho[1], Kyunghoon Yoon[1],
Donghwan Kim[2†]

[†]donghwan@korea.ac.kr

Solar Cells Research Center, Korea Institute of Energy Research[1]
Department of materials science & engineering, Korea university[2]

ABSTRACT

Despite the success of $Cu(In,Ga)Se_2$ (CIGS) based PV technology now emerging in several industrial initiatives, concerns about the cost of In and Ga are often expressed. It is believed that the cost of those elements will eventually limit the cost reduction of this technology. One candidate to replace CIGS is $Cu_2ZnSnSe_4$ (CZTSe), fabricated by co-evaporation technique. Co-evaporation technique will be one of the best methods to control film composition. This type of absorber derives from the $CuInSe^2$ chalcopyrite structure by substituting half of the indium atoms with zinc and other half with tin. Energy bandgap of this material has been reported to range from 0.8eV for selenide to 1.5eV for the sulfide and large coefficient in the order of $10^{14}cm^{-1}$, which means large possibility of commercial production of the most suitable absorber by using the CZTSe film. In this work, Effects of substrate temperature of $Cu_2ZnSnSe_4$ absorber layer on the performance of thin films solar cells were investigated. We reported on some of the absorber properties and device results.

Key Words: solar cell, thin film, $Cu_2ZnSnSe_4$ (CZTSe), Co-evaporation