P-88

전착법으로 제작한 동축형 CuInSe2 태양전지 연구

CuInSe2 coaxial solar cells made by electrodeposition

강윤묵, 김동환*,†

반도체 응용연구실 고려대학교, *고려대학교

(donghwan@korea ac.kr†)

The I-III-VI chalcopyrite materials have some very desirable properties for photovoltaic application CuInSe2, having a bandgap of 1 02 eV is considered an ideal material for photovoltaic application The material properties can be varied by replacing part of the indium by gallium and/or part of the selenium by sulfur to form Cu(In,Ga)(S,Se)2 High conversion efficiencies of almost 19 % have been achieved using these materials. Moreover, CIS-based solar cells are very stable, and thus their operational lifetimes are long The favorable optical properties of these materials (direct energy band gap and high absorption coefficient) allow the use of thin films (few micrometers) of material instead of thick slices of bulk silicon, reducing the consumption of materials CIS-based thin films can be prepared both from gas and liquid phases by a variety of methods

Electrodeposition is a liquid phase deposition method that can be used for the preparation of metal, semiconductor and conducting oxide thin films Its advantages include the feasibility of upscaling to large substrate areas and production volumes Moreover, the deposition equipment is relatively simple and the deposition temperatures are considerably lower than in many other methods These features make electrodeposition a low-cost deposition method Thus the fact that the solar cell efficiencies achieved with electrodeposited films are generally somewhat lower than those achieved by the more expensive gas-phase methods is not necessarily a major drawback, since it is compensated by the lower process costs

The purpose of this study was to develop and study electrodeposition processes for the preparation of thin films for CuInSe2 solar cells This letter presents the electrodeposition of p-, i- and n-type CIS layers from a single electrolyte and material as well as preliminary device properties