As the CdS buffer layer of CIGS thin film solar cell as typical material contained the toxic hazard Cd, the ZnS buffer layer with high transmittance and good adhesion has been actively studied. In this study, ZnS buffer layer of CIGS thin film solar cell using thioacetamide(TAA) was studied. In general, when forming ZnS buffer layer, the thiourea(SC(NH$_2$)$_2$) is used. In this case, since the growth rate of the thin film is low, the longer deposition time is needed to obtain a uniform thin film. ZnS thin films were deposited on ITO substrate by CBD process. The CBD technique using aqueous reagents of ZnSO$_4$, TAA(CH$_3$CSNH$_2$), and NH$_3$OH. The fixed variables were a ZnSO$_4$ concentration of 0.1 M, process temperature of 65 ℃ and magnetic stirrer rotating 250rpm. The process parameters were TAA 0.0125 M ~ 1.0 M, NH$_3$OH 1.0 M ~ 4.0 M, and deposition time 1 ~ 20 minutes. The ZnS buffer layer that was deposited using thiourea at 1.0 M and a deposition time of 40 minutes was most uniform thin film of 40 nm thickness. The ZnS buffer layer that was deposited using TAA at 0.1 M and for 3 minutes, the band gap was 3.78 eV, thickness of 40 nm and also smaller than when using thiourea. Also more uniform thin films with high transmittance of 83% were formed. However, when the deposition time was more than 5 minutes, the reacted granules were deposited on the surface, and the transmittance was drastically decreased. As a result, it was confirmed the using TAA for ZnS buffer layer in smaller amount and shorter deposition time produces higher quality films than when using thiourea.

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