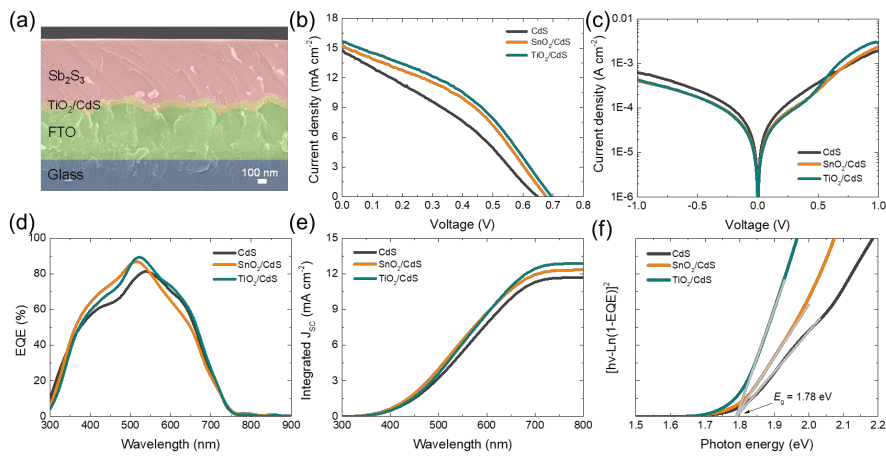


# Low Toxicity Electron Transport Layer of Atomic Layer Deposited $\text{TiO}_2$ and $\text{SnO}_2$ for $\text{Sb}_2\text{S}_3$ Thin Film Solar Cells

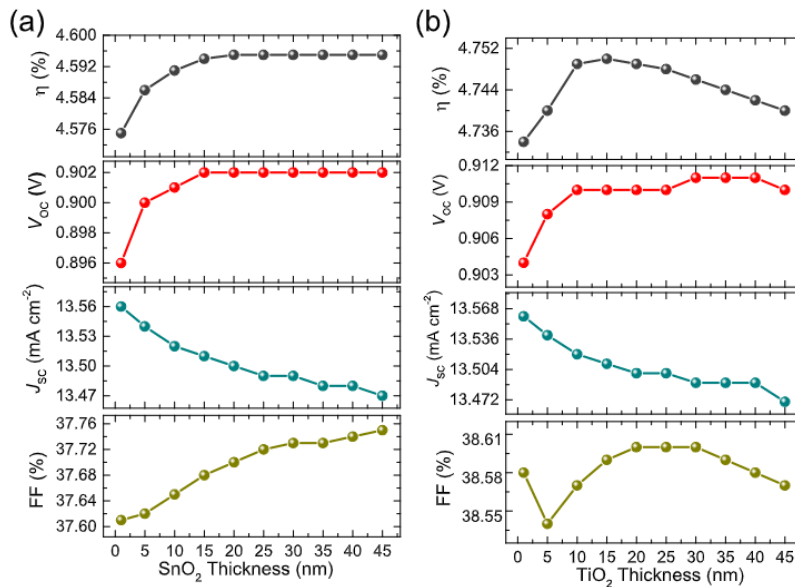
Yong Tae Kim, Pravin S. Pawar and \*Jaeyeong Heo

Department of Materials Science and Engineering and Optoelectronics Convergence Research Center, Chonnam National University, Gwangju 61186, Republic of Korea

\*[jheo@jnu.ac.kr](mailto:jheo@jnu.ac.kr)



**Figure 1** (a) FE-SEM cross section image of the  $\text{FTO}/\text{TiO}_2/\text{CdS}/\text{Sb}_2\text{S}_3$  device, (b) light  $J-V$  characteristics, (c) dark  $J-V$  characteristics, (d) EQE spectra, (e) integrated  $J_{sc}$  estimated from EQE, (f) Bandgap of  $\text{Sb}_2\text{S}_3$  from EQE for CdS,  $\text{SnO}_2/\text{CdS}$ ,  $\text{TiO}_2/\text{CdS}$  samples.



**Figure 2** Device parameters ( $V_{oc}$ ,  $J_{sc}$ , FF, and  $\eta$ ) of the simulated double buffer layered devices with various  $\text{SnO}_2$  (a) and  $\text{TiO}_2$  (b) thicknesses.