

Supporting Information

Effect of indium doping on surface optoelectrical properties of $\text{Cu}_2\text{ZnSnS}_4$ photoabsorber and interfacial/photovoltaic performance of cadmium free $\text{In}_2\text{S}_3/\text{Cu}_2\text{ZnSnS}_4$ heterojunction thin film solar cell

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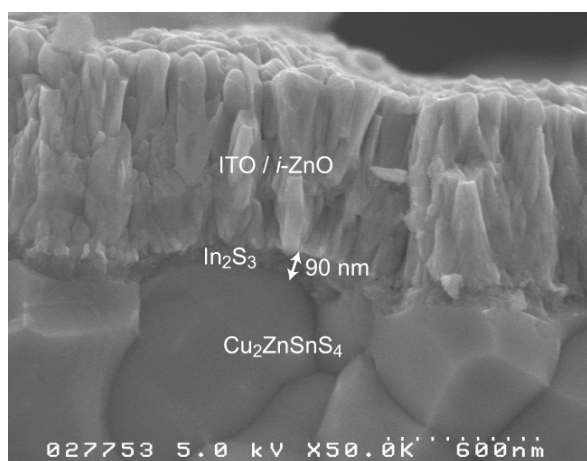


Figure S1 A cross-sectional SEM image of the 90-nm-thick- In_2S_3 -deposited CZTS solar cell.

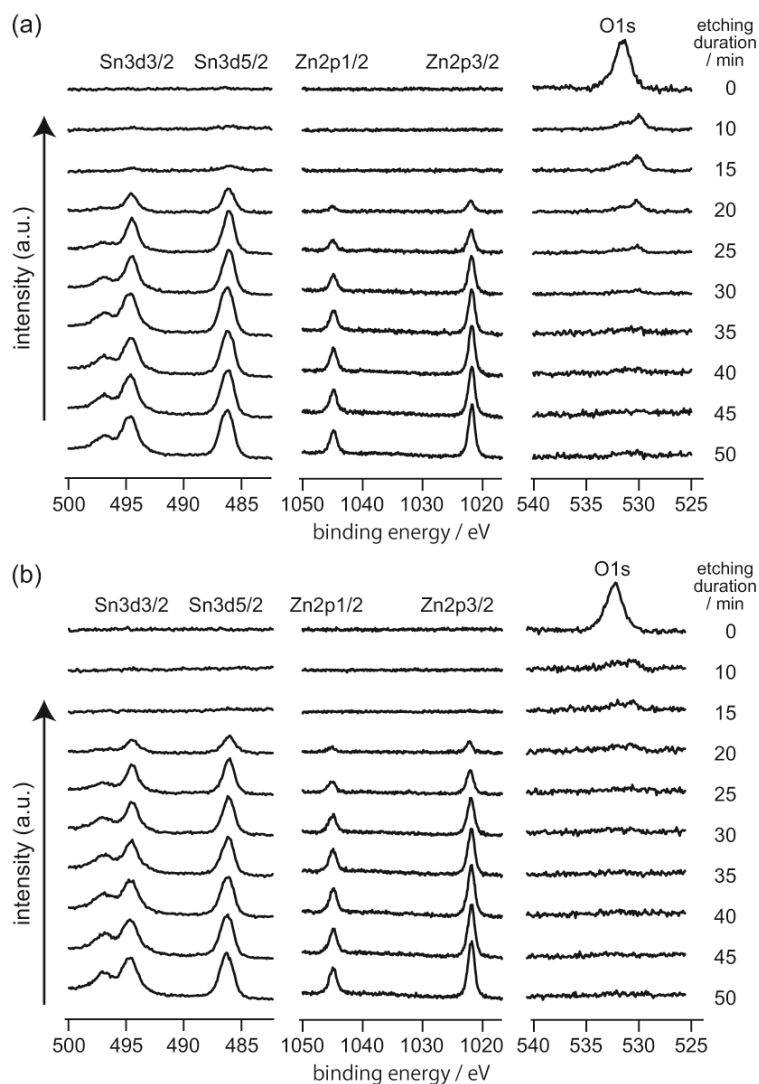


Figure S2 Sn3d, Zn2p and O1s XP spectra of (a) $\text{In}_2\text{S}_3(90)/\text{Cu}_2\text{ZnSnS}_4_{\text{w/o}}$ and (b) $\text{In}_2\text{S}_3(90)/\text{Cu}_2\text{ZnSnS}_4_{\text{PH}}$ films after Ar^+ etching with various durations.

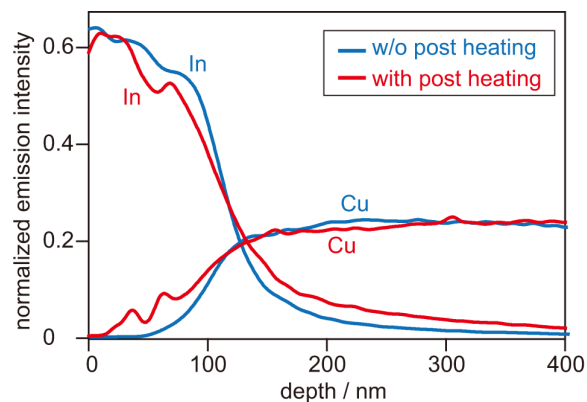


Figure S3 rf-GDOES profiles of In and Cu components in $\text{In}_2\text{S}_3(90)/\text{Cu}_2\text{ZnSnS}_4_{\text{w/o}}$ and $\text{In}_2\text{S}_3(90)/\text{Cu}_2\text{ZnSnS}_4_{\text{PH}}$ films.

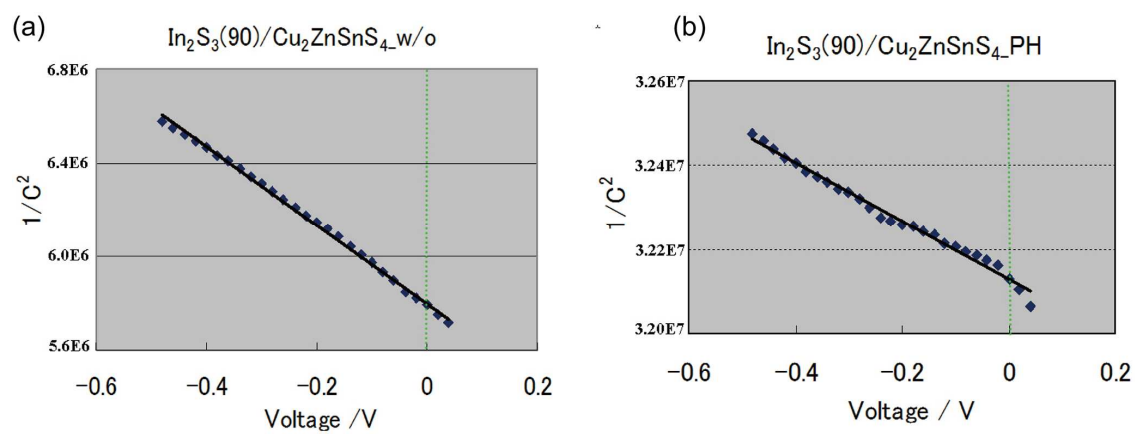


Figure S4 Capacitance-voltage (C-V) plots of solar cells based on (a) $\text{In}_2\text{S}_3(90)/\text{Cu}_2\text{ZnSnS}_4_{\text{w/o}}$ and (b) $\text{In}_2\text{S}_3(90)/\text{Cu}_2\text{ZnSnS}_4_{\text{PH}}$ films.