

## Supporting Information

### **Solution-processed Cu<sub>2</sub>ZnSnS<sub>4</sub> absorbers prepared by appropriate inclusion and removal of thiourea for thin film solar cells**

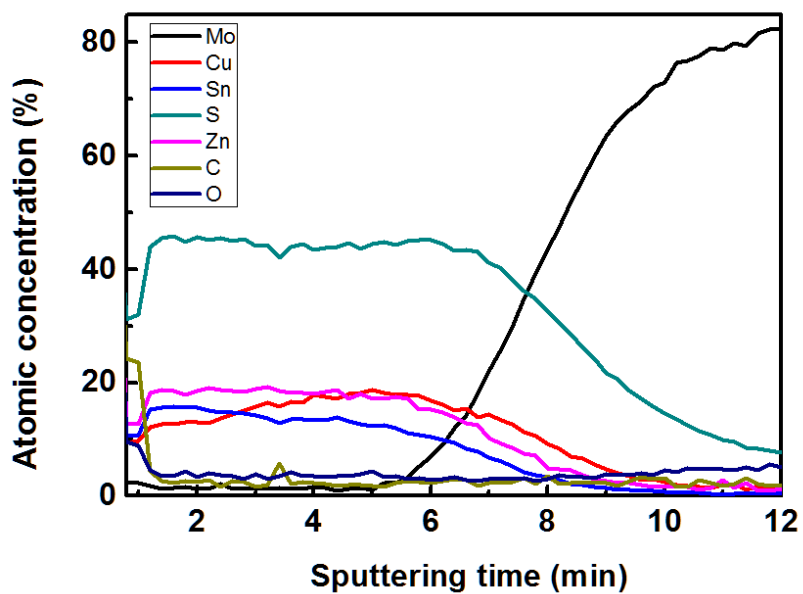
§Si-Nae Park<sup>a</sup>, §Shi-Joon Sung<sup>a</sup>, Dae-Ho Son<sup>a</sup>, Dae-Hwan Kim<sup>a</sup>, Mungunshagai Gansukh<sup>b</sup>, Hyeonsik  
Cheong<sup>b</sup>, JunHo Kim<sup>c</sup>, Jin-Kyu Kang<sup>a\*</sup>

<sup>a</sup>Advanced Convergence Research Center, Daegu Gyeongbuk Institute of Science & Technology  
223 Sang-Ri, Hyeonpung-myeon, Dalseong-gun, Daegu 711-873, Republic of Korea

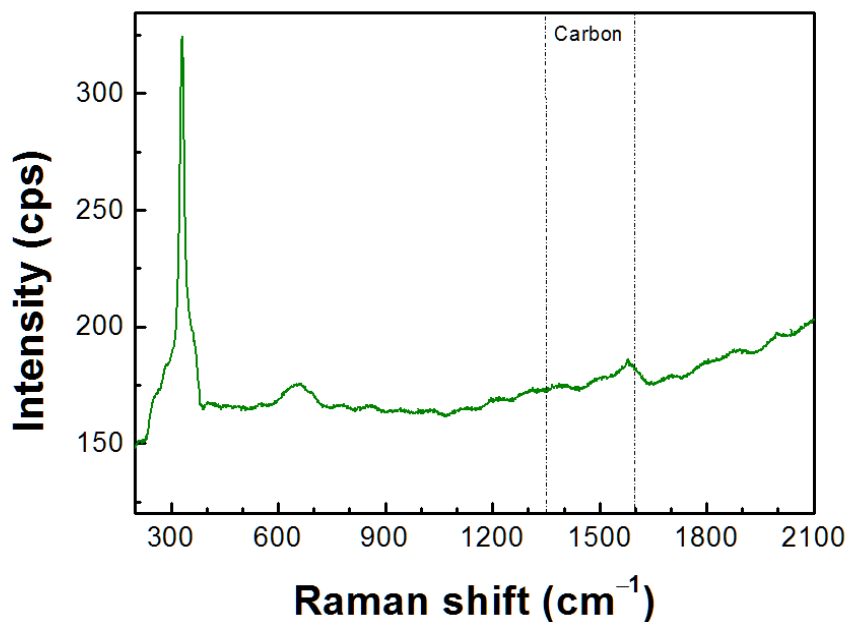
<sup>b</sup>Department of Physics, Sogang University  
35 Baekbeom-ro, Mapo-gu, Seoul 121-742, Republic of Korea

<sup>b</sup>Department of Physics, Incheon National University  
12-1 Songdo-dong, Yeonsu-gu, Incheon 406-772, Republic of Korea

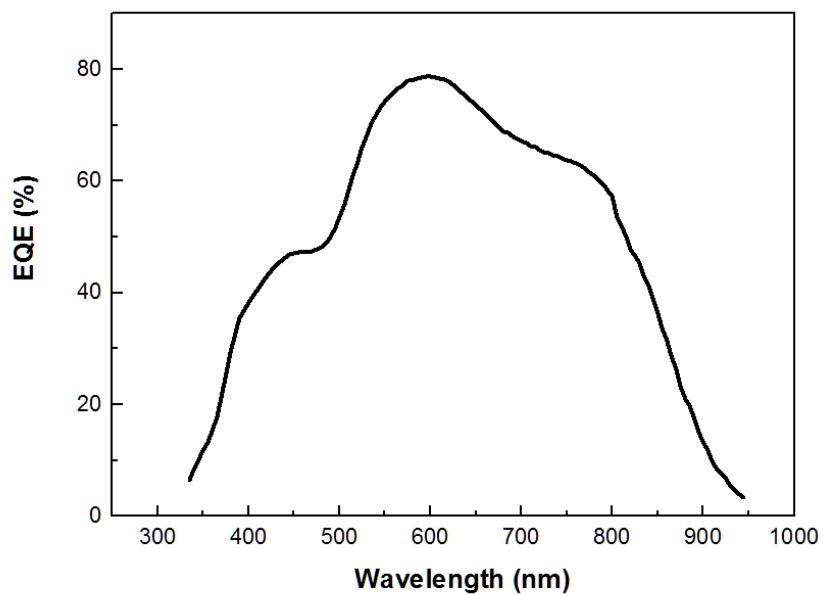
Corresponding author e-mail: [appolon@dgist.ac.kr](mailto:appolon@dgist.ac.kr)



**Figure S1.** Component depth profile of a sulphurized CZTS thin film pre-annealed at 350°C by Auger Electron Spectroscopy (AES)



**Figure S2.** Raman spectra of a sulphurized CZTS thin film pre-annealed at 350°C in a range of 200~2100 nm by using 632.8-nm-wavelength He-Ne laser and as a light source.



**Figure S3.** External Quantum Efficiency (EQE) curve of a CZTS thin film solar cell pre-annealed at 350°C.