

Supplementary Information

A Facile Chemical-Mechanical Polishing Lift-Off Transfer Process Toward Large Scale Cu(In,Ga)Se₂ Thin-Film Solar Cells on Arbitrary Substrates

Kuan-Chun Tseng^a, Yu-Ting Yen^a, Stuart R. Thomas^b, Hung-Wei Tsai^a, Cheng –Hung Hsu^a,
Wen-Chi Tsai^a, Chang-Hong Shen^c, Jia-Min Shieh^c, Zhiming M. Wang^b and Yu-Lun Chueh

*a

^a Department of Materials Science and Engineering, National Tsing Hua University, Hsinchu, 30013, Taiwan, ROC. *Email: ylchueh@mx.nthu.edu.tw

^b Institute of Fundamental and Frontier Sciences, University of Electronic Science and Technology of China, People's Republic of China

^c National Nano Device Laboratories, No. 26, Prosperity Road 1, Hsinchu 30078, Taiwan, ROC.

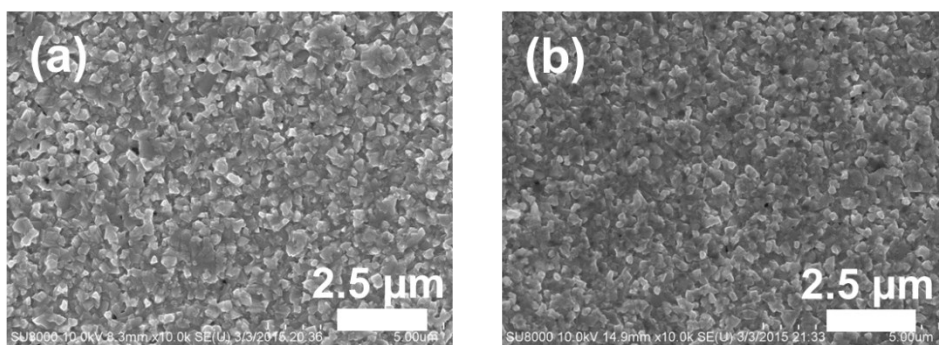


Fig S1. FE-SEM top view images showing (a) pristine CIGS film surface and (b) CIGS film surface after transfer process, showing no change in surface morphology.

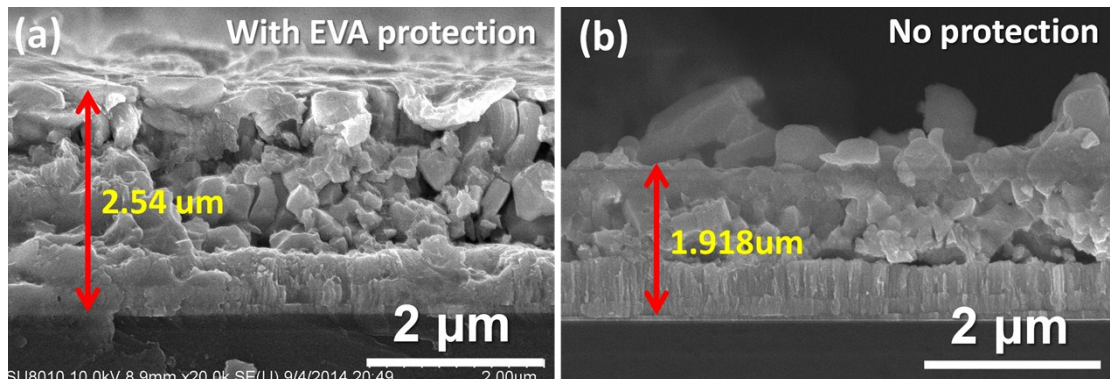


Fig S2. FE-SEM cross-sectional images showing (a) complete device structure following transfer to aluminum substrate (b) loss of transparent conducting oxide layers when no protective EVA/quartz protective layer is employed.

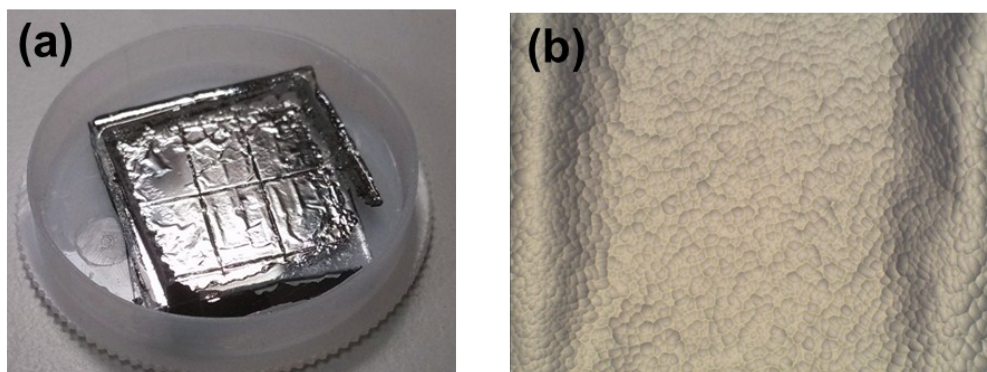


Fig S2. (a) Photo image of wrinkled Mo surface following removal of SLG via etching and mechanical grinding process and (b) 10X magnification of image (a).

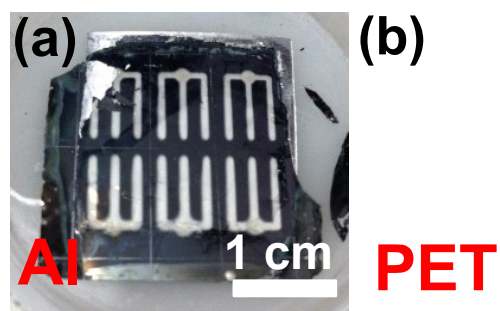


Fig S4. Optical images of solar cells on (a) aluminum foil and (b) polyethylene terephthalate (PET).

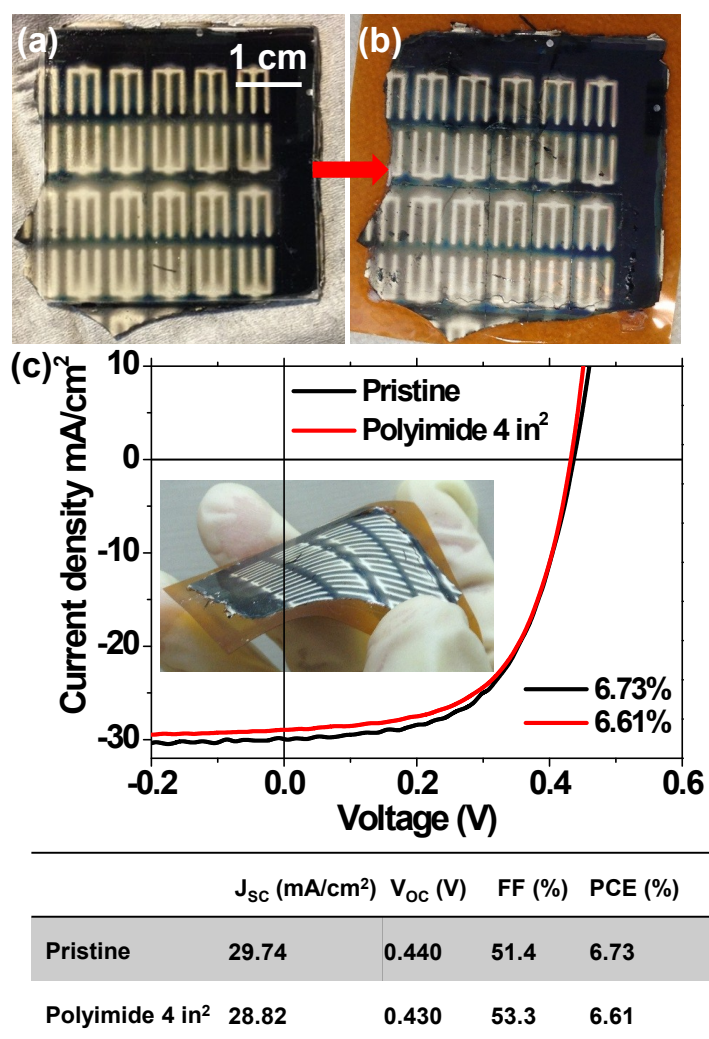


Fig S5. Optical images of solar cells transferred onto polyimide films (a) showing large scale 4 in² square fabrication, (b) flexibility of devices fabricated large substrates and (c) characterization data obtained from best performing devices after the post CMPL transfer.