Supporting Information

Figure S1. (a) XPS spectrum of SnO$_2$ film. (b) XPS spectrum of SnO$_2$/C$_{60}$-SAM film. The appearance of the N 1s signal in SnO$_2$/C$_{60}$-SAM film represents the successful deposition of C$_{60}$-SAM above the SnO$_2$ layer. (c) AFM image of SnO$_2$ film. (d) AFM image of SnO$_2$/C$_{60}$-SAM film. SnO$_2$ films with or without C$_{60}$-SAM show similar morphology, illustrating that the C$_{60}$-SAM-deposition process makes no impact on the film morphology of the SnO$_2$ layer.

Figure S2. UPS spectrum of FA$_{0.5}$MA$_{0.5}$Sn$_{0.5}$Pb$_{0.5}$I$_3$ perovskite. In the UPS measurements, a He I source with photon energy of 21.22 eV was used to excite the sample. Therefore, the calculated VB is 5.2 eV.
Figure S3. Absorption of $\text{FA}_{0.5}\text{MA}_{0.5}\text{Sn}_{0.5}\text{Pb}_{0.5}\text{I}_3$ films deposited above $\text{SnO}_2$ and $\text{SnO}_2/\text{C}_6\text{0}-\text{SAM}$ substrates.

Figure S4. EQE spectra (solid lines) and their integrated current density (solid lines with dots) of PVSCs with different ETLs.