Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supplementary information

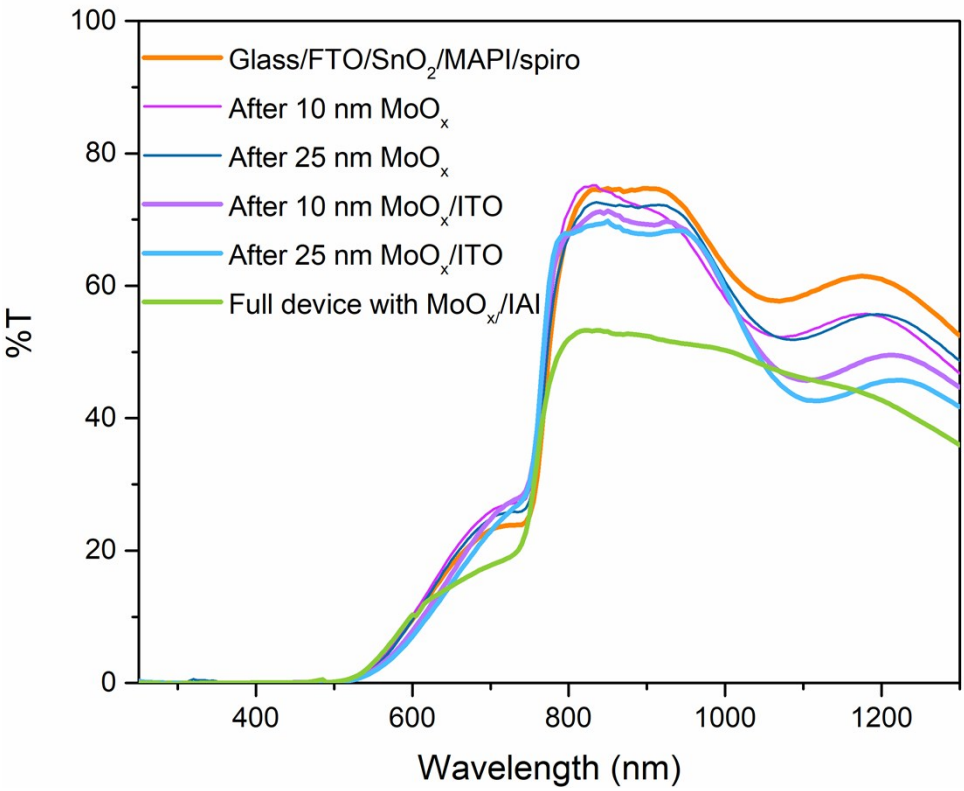

Figure S1. Transmittance of samples of baseline Glass/FTO/SnO_2/MAPI/spiro, after 10 nm MoO_x coating, after 25 nm MoO_x coating, after 10 nm MoO_x/ITO coating, after 25 nm MoO_x/ITO coating and a full device with MoO_x/IAI top electrode.

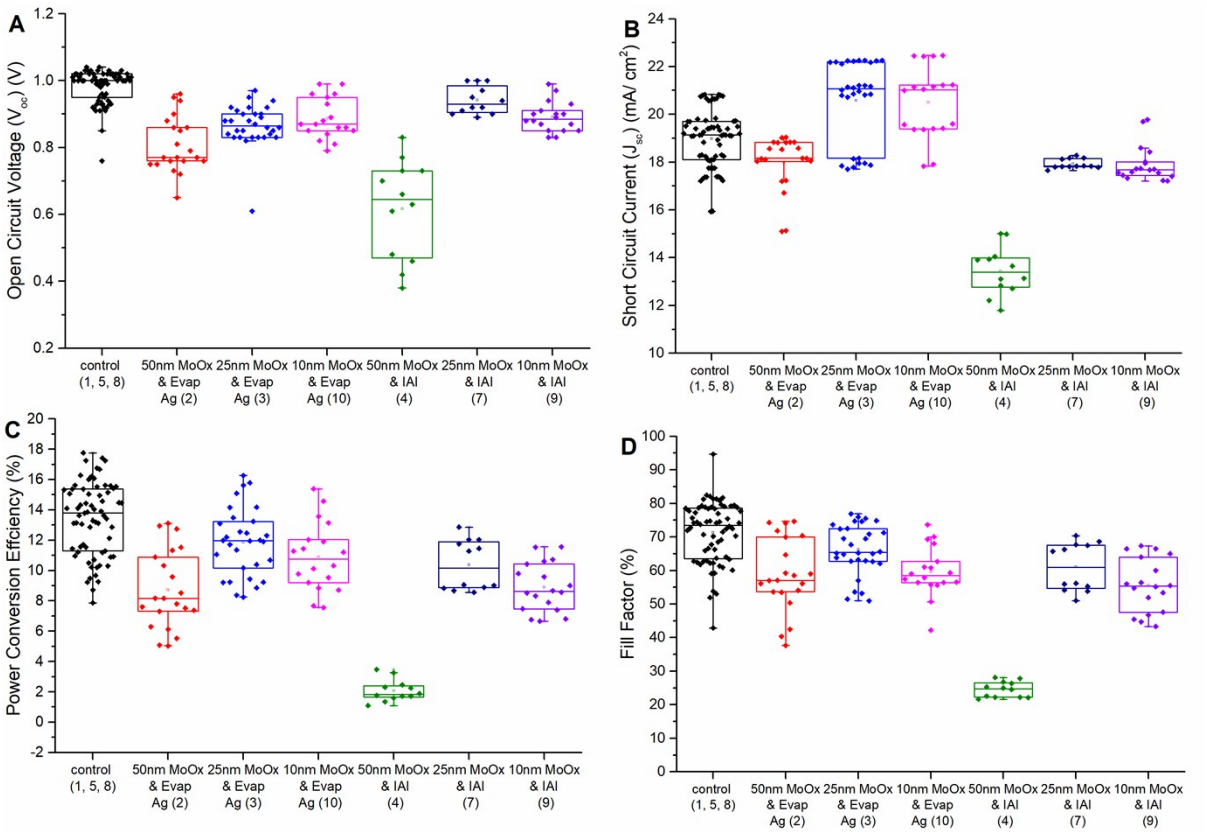

Figure S2. (A-D) Box charts of J-V characteristics of perovskite solar cells with Ag, MoO_x/Ag and MoO_x/IAI top electrodes. The dramatically reduced power conversion efficiency of 50 nm-MoO_x/IAI was mainly due to mis-alignment of the mask during sputtering of the top ITO layer.

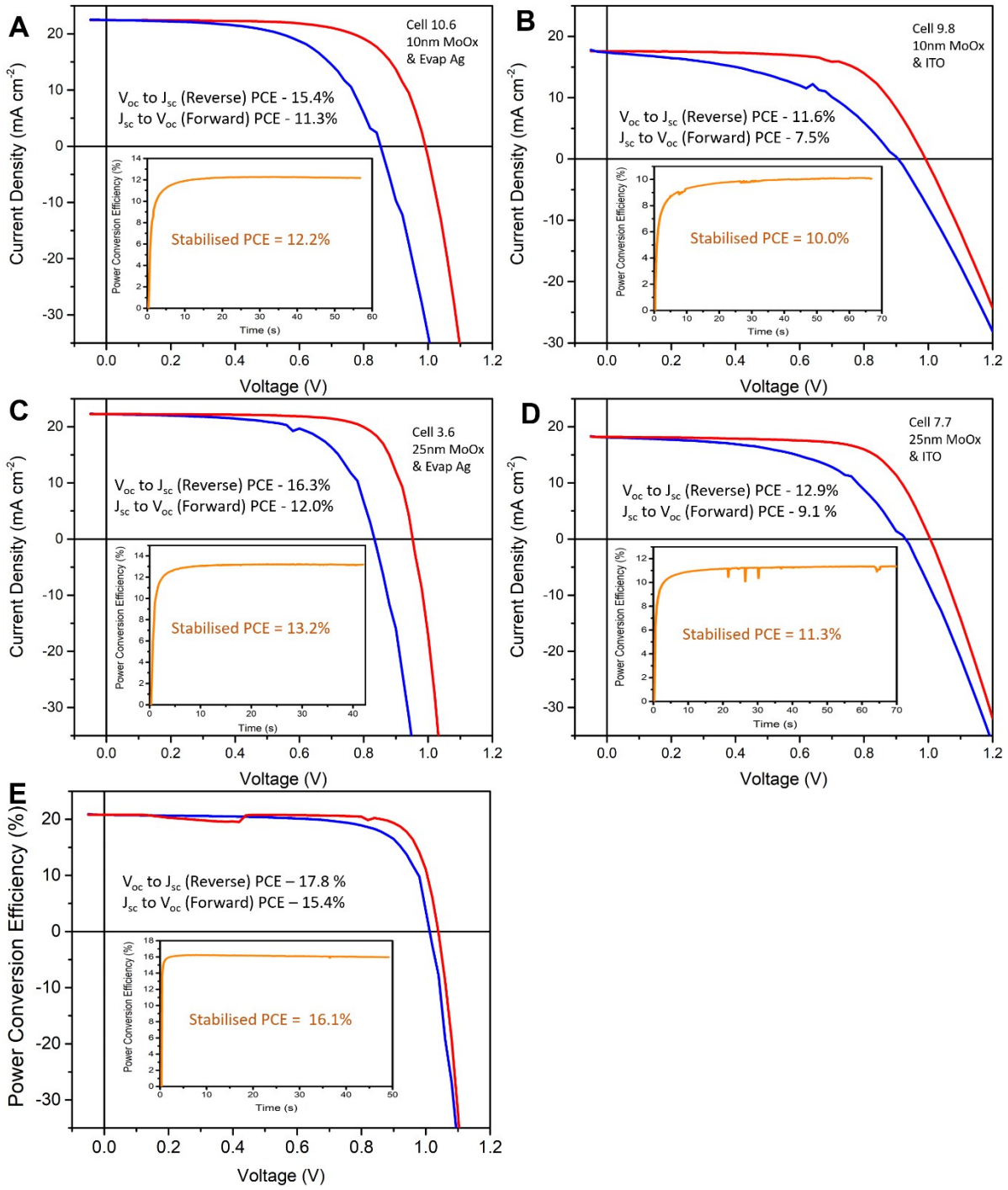

Figure S3. Current density–voltage (J–V) curves in forward (-0.05V to 1.2 V) and backward scan (1.2Vto -0.05 V) of the representative perovskite solar cells with (a) 10 nm MoO_x/Ag opaque electrode, (b) 10 nm MoO_x/IAI transparent electrode, (c) 25 nm MoO_x/Ag opaque electrode, (d) 25 nm MoO_x/IAI transparent electrode, (e) control perovskite solar cell with Ag electrode. The graphs of steady-state output at the maximum power point of the corresponding cells under continuous simulated AM1.5G 1 sun illumination were embedded into the main figure.

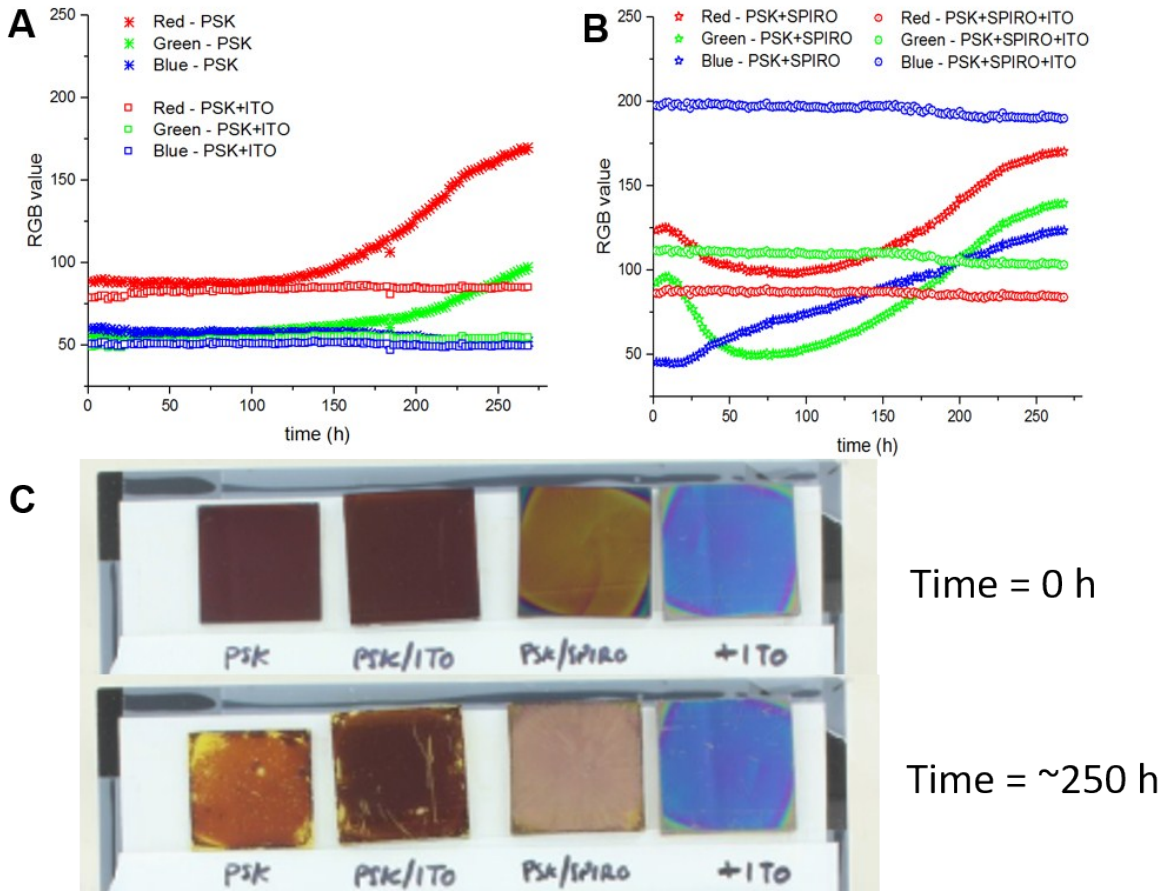

Figure S4. Time lapse photography and RGB analysis. (a) RGB colour change of an unencapsulated perovskite sample with and without ITO coating over 250 h in the light box; both samples show very similar RGB values at the beginning, meaning the ITO layer does not change much the appearance of the perovskite layer underneath; the perovskite-only sample changes its colour with time whereas the ITO covered perovskite maintains constant RGB values over time (flat lines for all three components); (b) RGB colour change of an unencapsulated perovskite/sprio sample with and without ITO coating over 250 h in the light box. The starting RGB values reveal different colours depending on the presence of ITO; the ITO covered spiro sample does not change over time; (c) The read time photos show the initial and final colour at time of 0 hour and 250 hours.