Electronic Supplementary Information

High performance planar *p-i-n* perovskite solar cells based on thin Alq_3 cathode buffer layer

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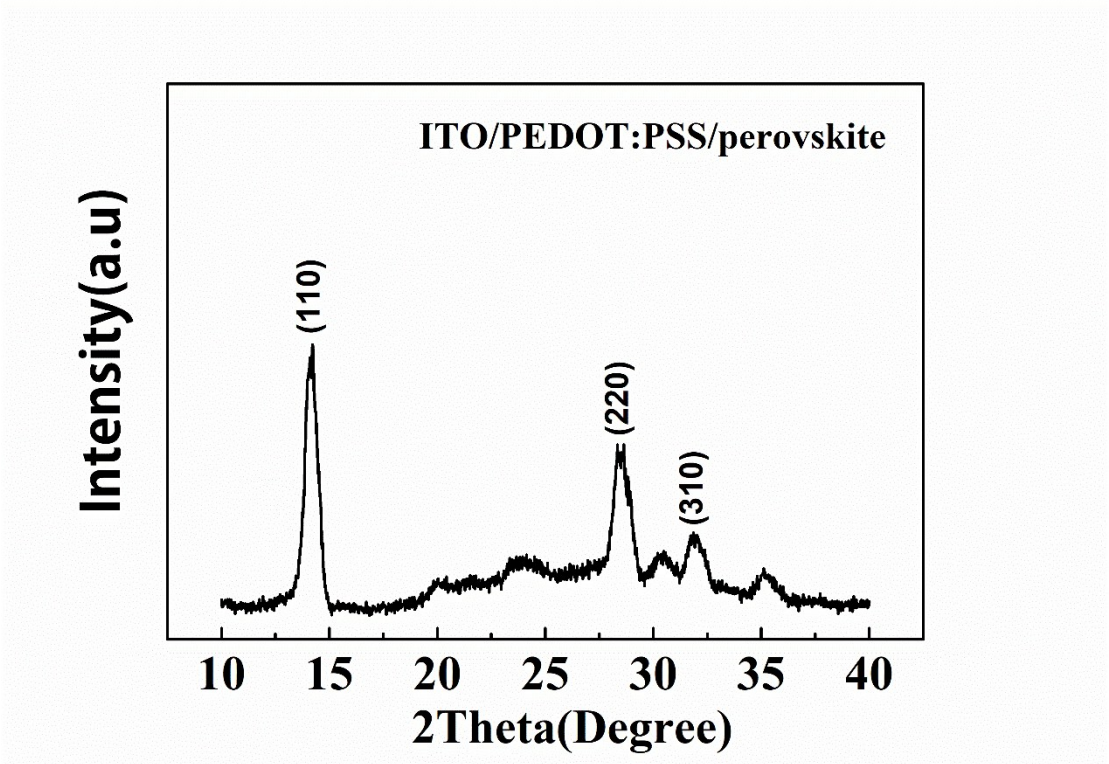

Figure S1. The XRD patterns of perovskite film on PEDOT:PSS.

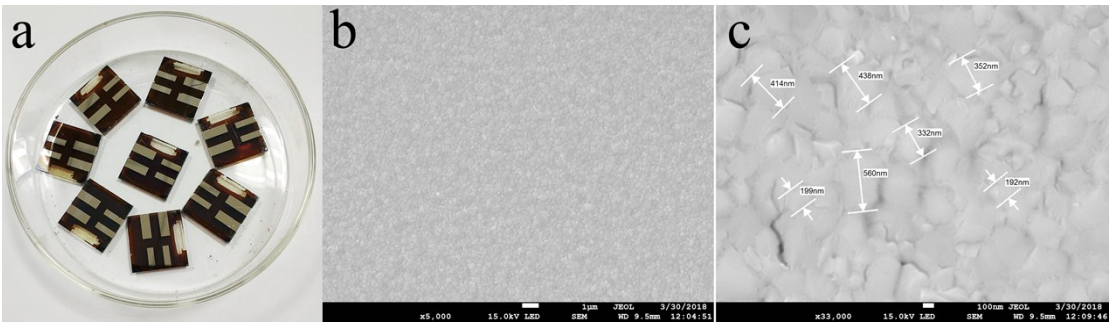

Figure S2. (a) The photograph of devices, (b) and (c) The SEM images of perovskite films.

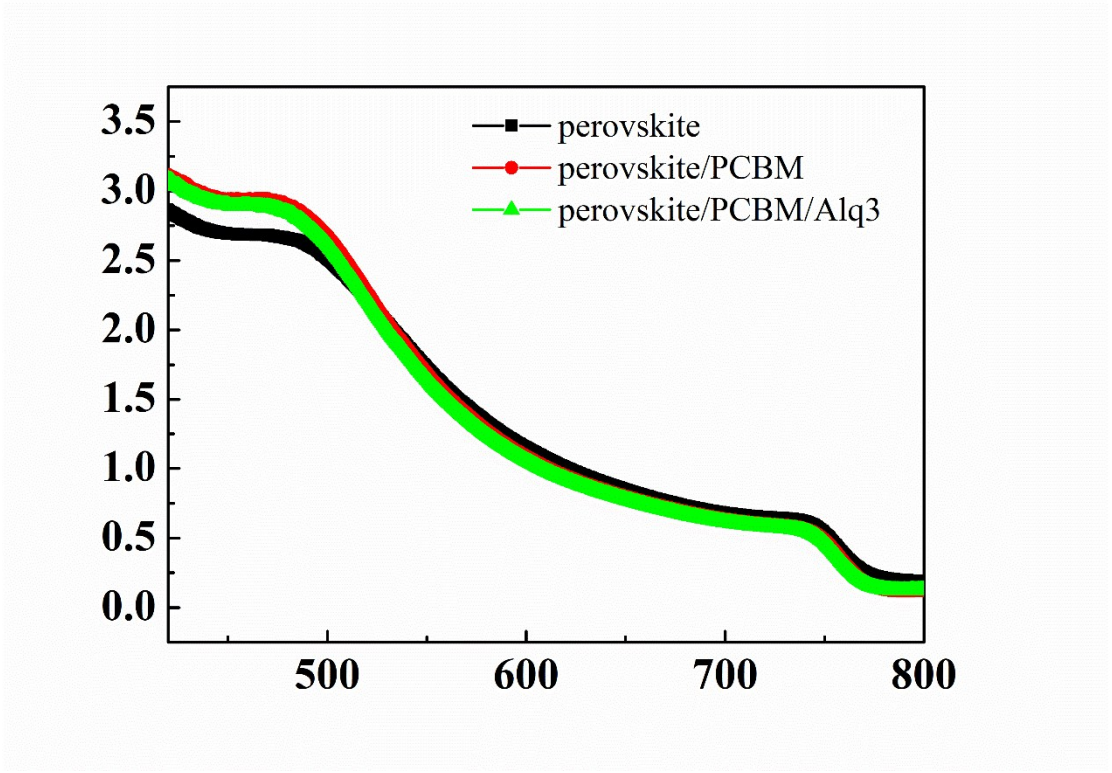

Figure S3. The absorbance of perovskite films with and without buffer layer covered

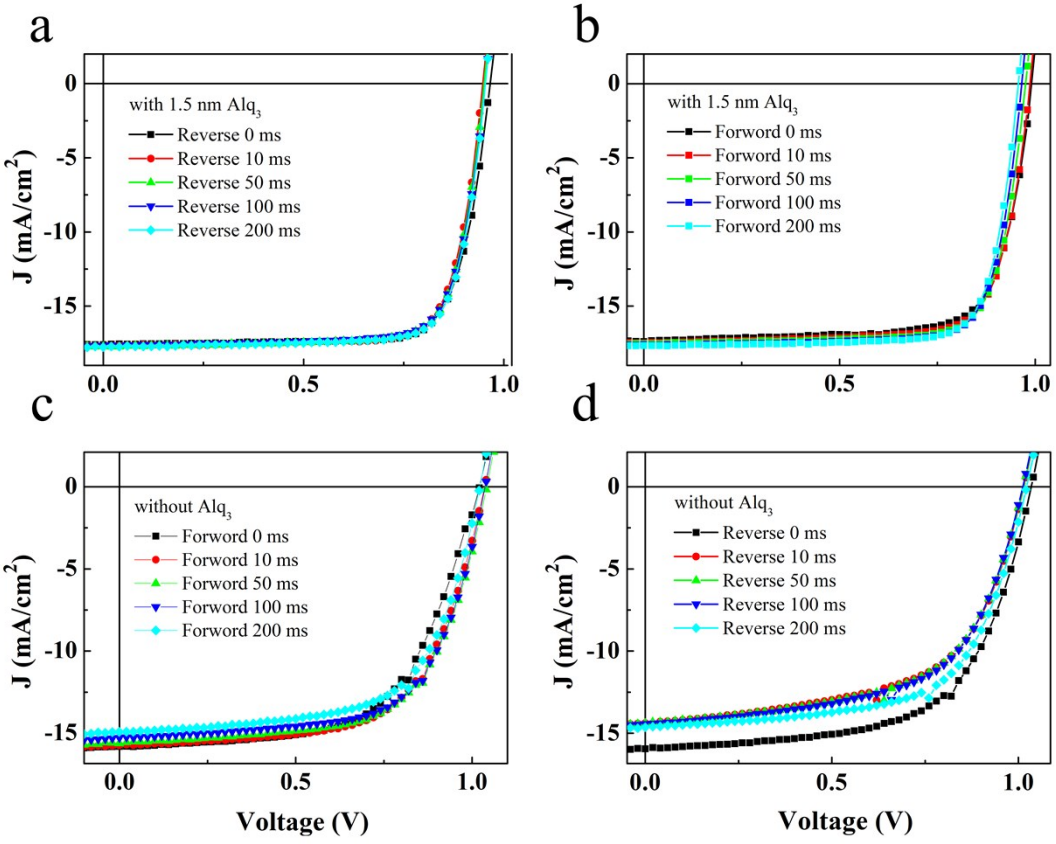

Figure S4. Hysteresis J-V measurements scanned in reverse and forward directions with different delay times for devices with 1.5 nm Alq_3 (a, b) and without Alq_3 (c, d).

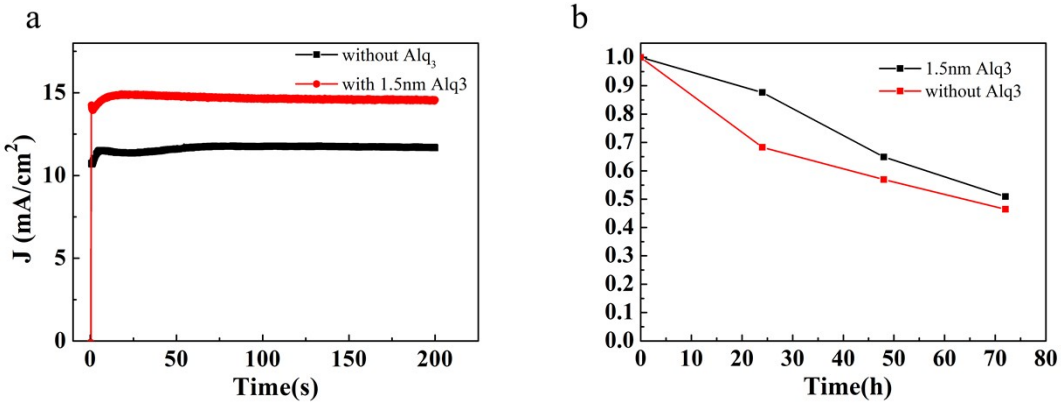

Figure S5. Stability test of solar cells. (a)Stabilized outputs of the PSCs at the maximum power points. (b) Stability and long cycling performance of the solar cells in standard atmospheric (30%-40% RH)