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

Supporting Information

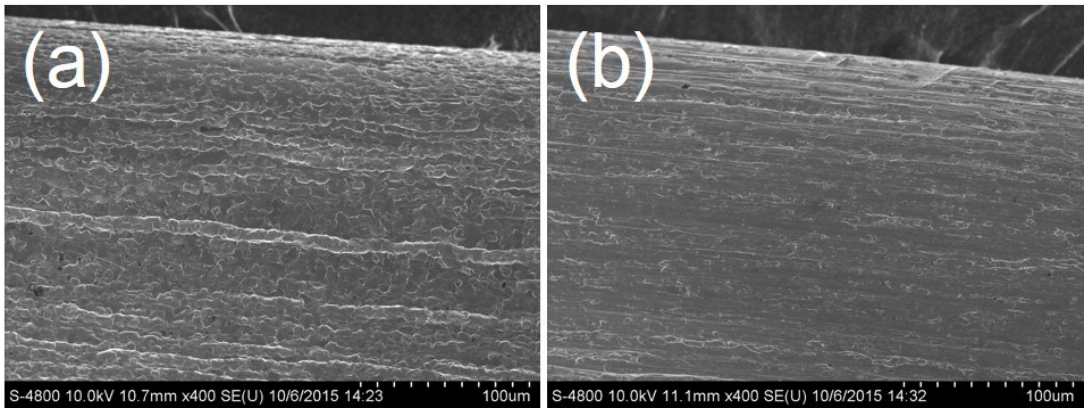

Figure S1. The Ti wire before (a) and after (b) mechanical polishing.

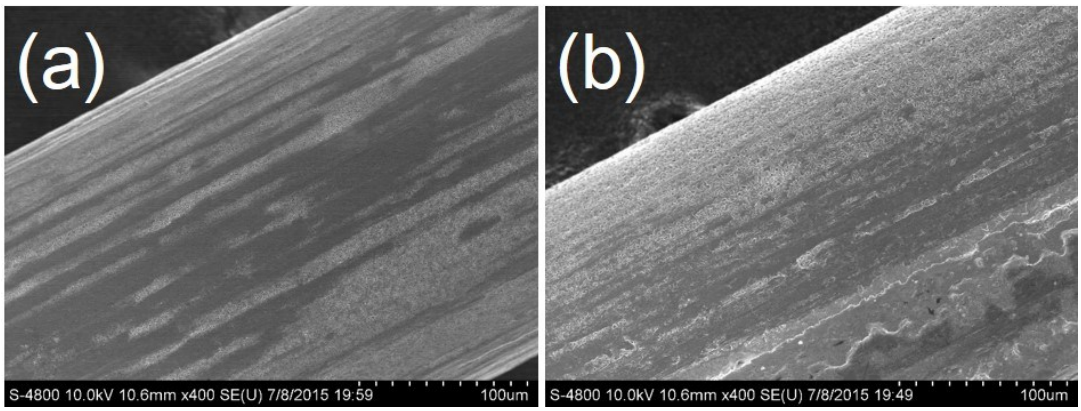

Figure S2. The thickness of mesoporous TiO_2 layer is (a) 100nm (b) 0 nm after deposit the perovskite layer.

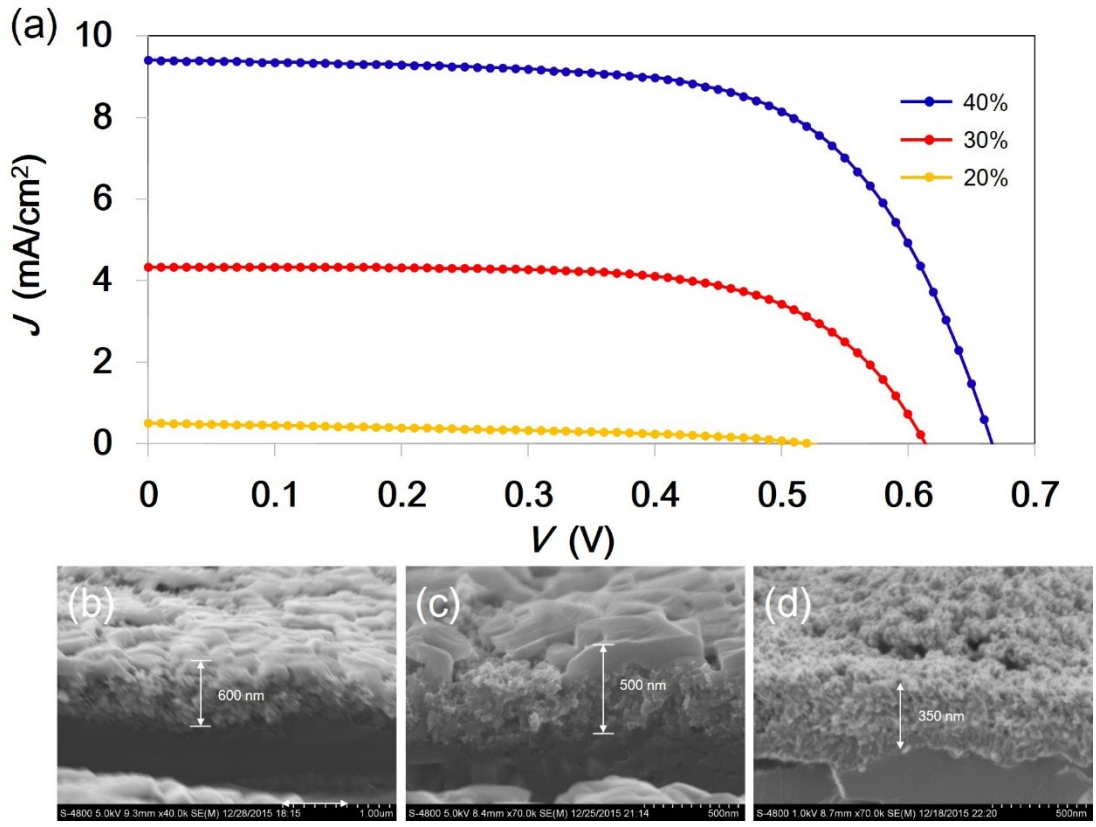

Figure S3. (a) J–V curves of FPSCs with various concentrations of perovskite precursor solution. The thickness of perovskite layer (including mesoporous layer) was formed by (b) 40% (c) 30% (d) 20% concentrations of perovskite precursor solution. Although the 30% concentration of perovskite precursor solution generates the thickness of 500nm, the capping layer cannot cover the surface completely, so the PCE (V_{oc} of 0.614 V, J_{sc} of 4.32 mA/cm^2, FF of 0.660, and PCE of 1.75%) is far lower than PCE (V_{oc} of 0.666 V, J_{sc} of 9.42 mA/cm^2, FF of 0.650, and PCE of 4.07%) of 40% condition.

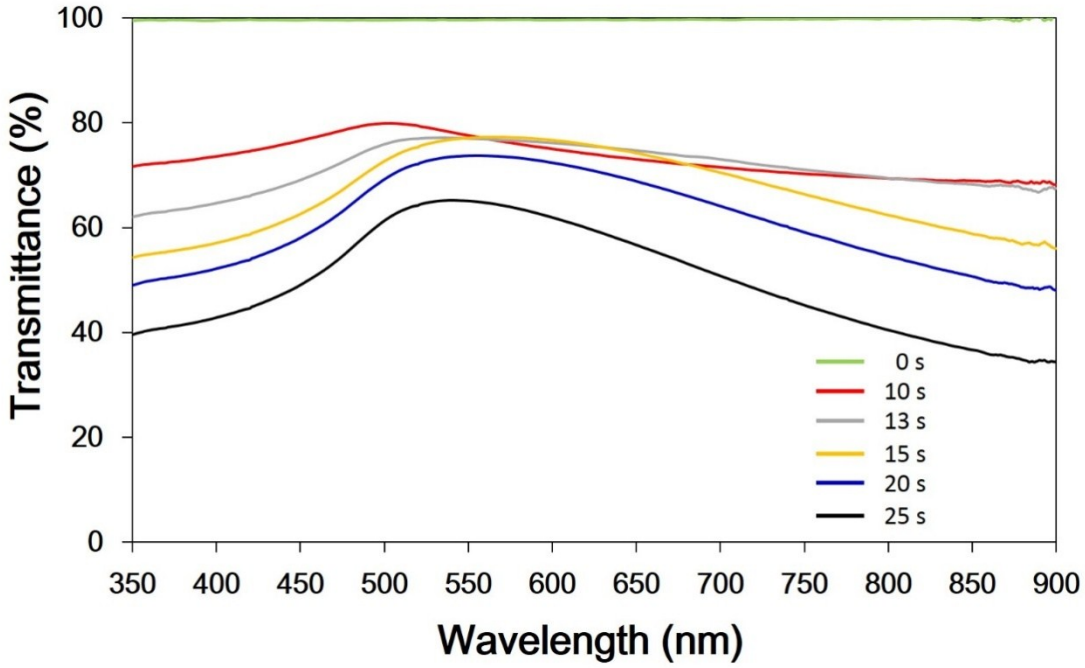

Figure S4.Transmittance of the thin gold electrode between 350–900 nm.

The transparency spectrum of gold thin film with 15s sputtering exhibited an average transmittance of about 65% in the wavelength range of 350–900 nm.

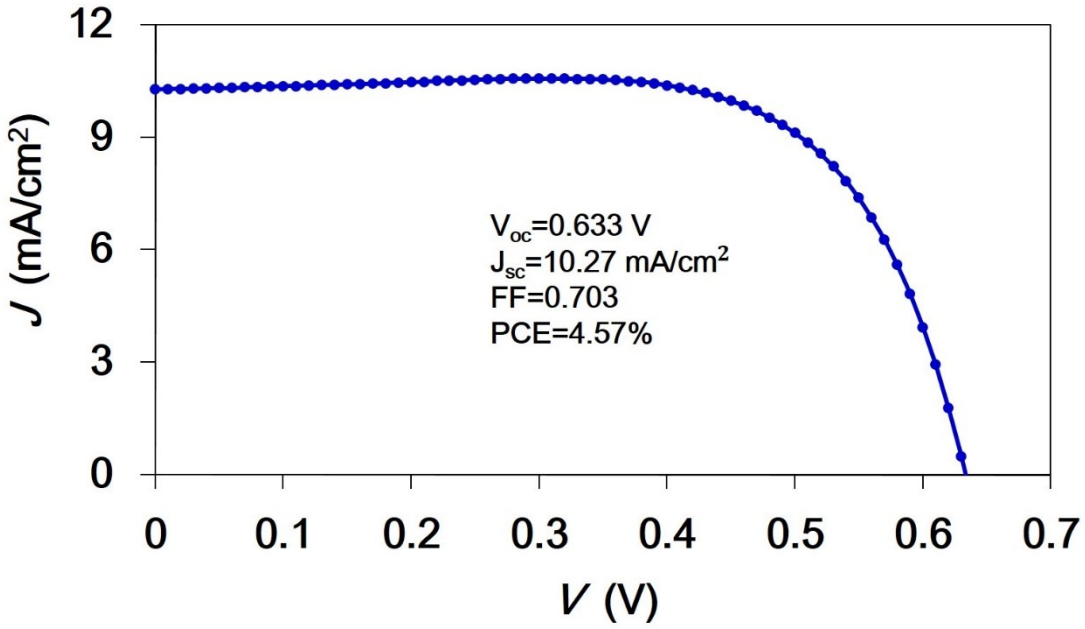

Figure S5. J–V curve of the highest fill factor fiber-shaped perovskite solar cell in this work.

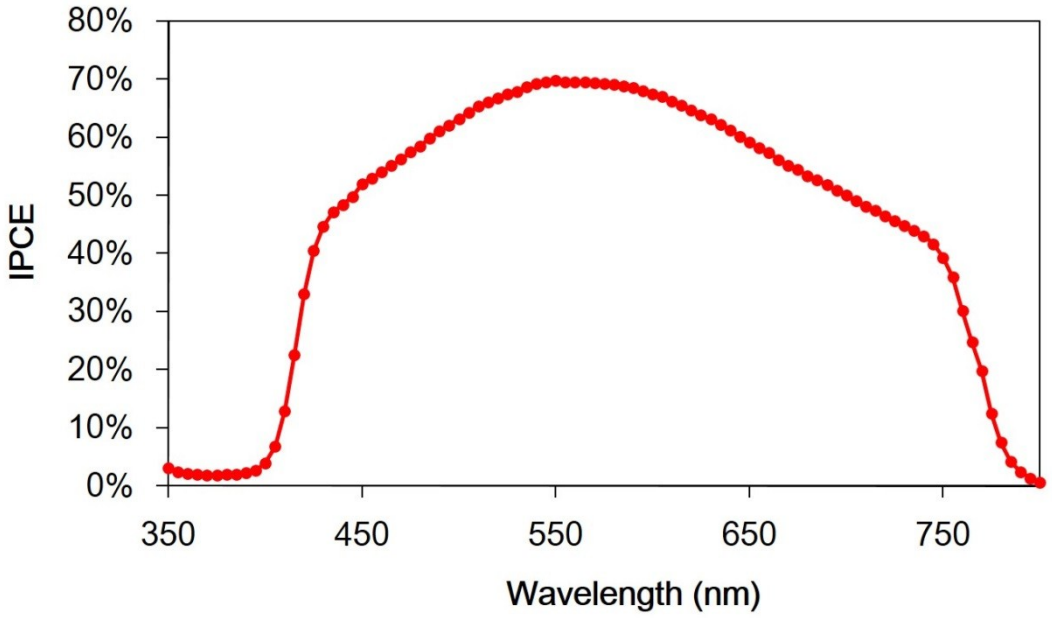

Figure S6. Incident photon-to-electron conversion efficiency (IPCE) spectrum of the quintessential model planar perovskite solar cell. The integrated Jsc was calculated to be 13.42 mA cm^{-2}.

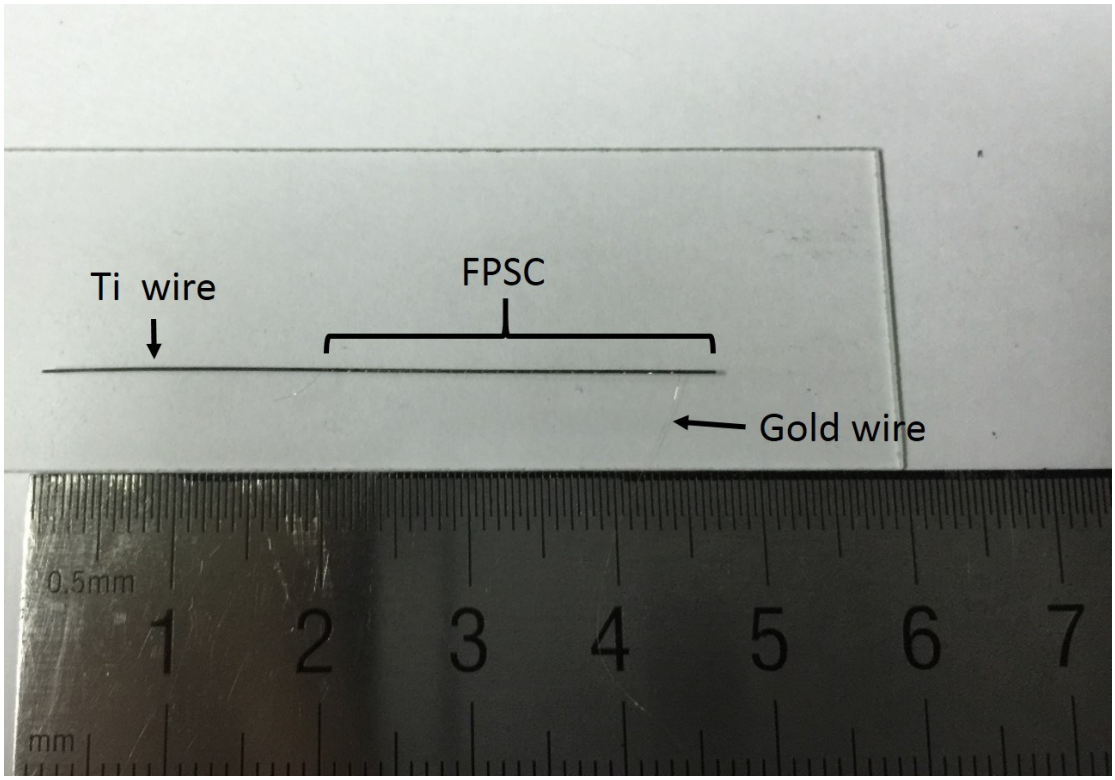

Figure S7. Photo of the fiber-shaped perovskite solar cell used in this work.

Table S1. Results of different dip-coating processes to prepare the perovskite layer

	V_{oc}(V)	J_{sc}(mA/cm^2)	FF	PCE (%)
Dip-coating once	0.60	2.33	0.43	0.60
Dip-coating twice	0.52	6.45	0.32	1.10
2min of infiltration	0.58	5.73	0.49	1.65
2 min of infiltration + dip-coating	0.67	11.23	0.58	4.42
10 min of infiltration	0.59	1.82	0.51	0.55
10 min of infiltration + dip-coating	0.54	8.51	0.45	2.12