Supplementary Information

Vertically aligned nanostructured TiO_2 photoelectrodes for high efficiency perovskite solar cells via block copolymer template approach

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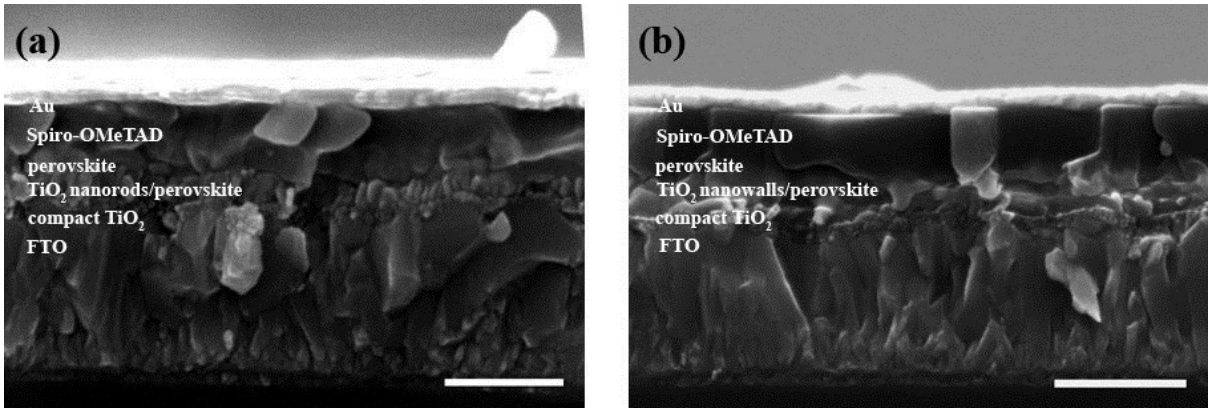

Fig. S1 FE-SEM images of perovskite solar cells using TiO_2 nanostructures from BCPs nanotemplates as an electron transport layer: (a) TiO_2 nanorods; (b) TiO_2 nanowalls. Both scale bars are 500 nm.

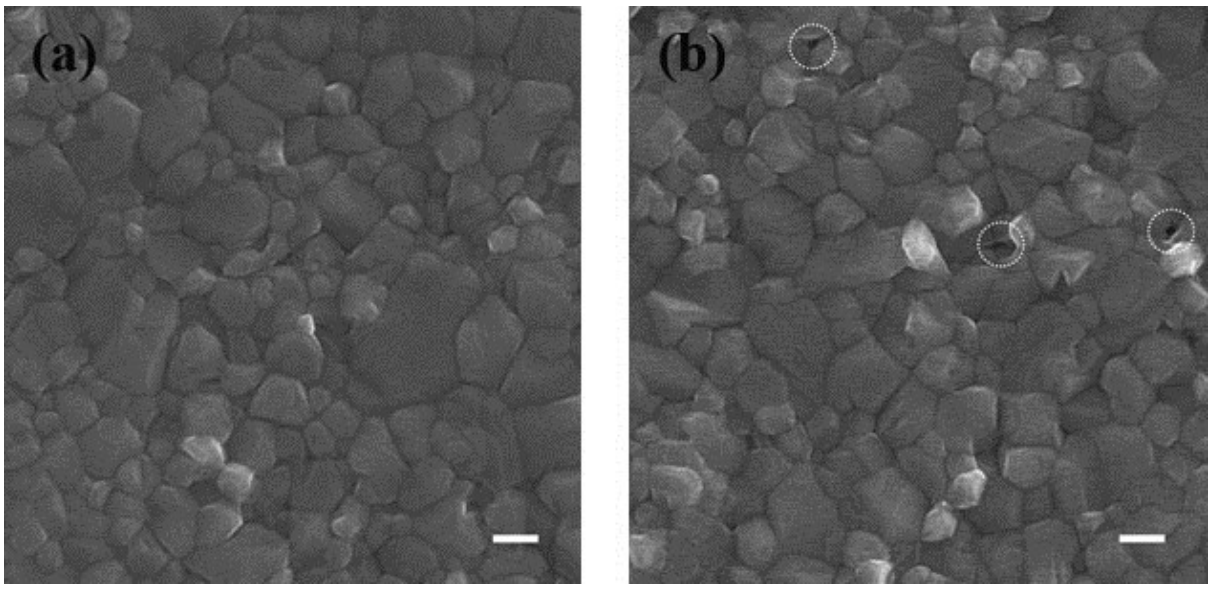

Fig. S2 FE-SEM images of perovskite film coated on FTO/compact TiO_2 layer/TiO_2 nanostructures: (a) TiO_2 nanorods; (b) TiO_2 nanowalls. Both scale bars are 200 nm.

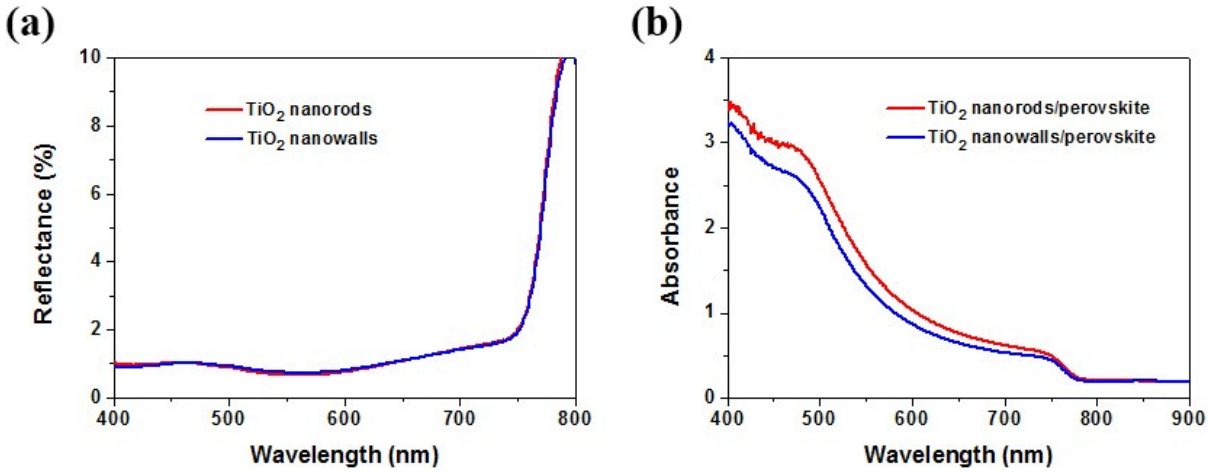

Fig. S3 (a) Reflectance spectra of the TiO_2 nanostructures. (b) UV-vis spectra of the TiO_2 nanostructures/$CH_3NH_3PbI_3$ films.

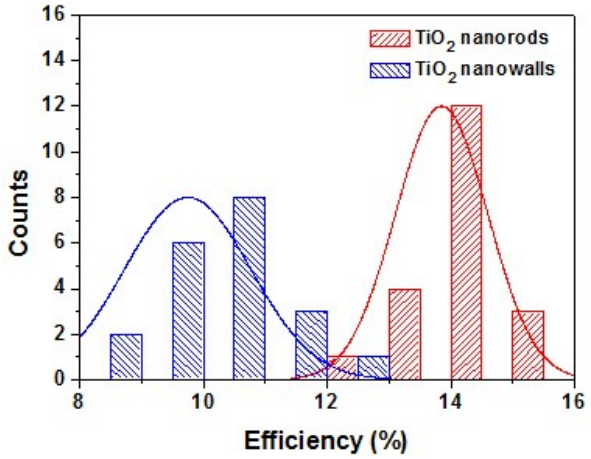

Fig. S4 Histogram of the PCE obtained from 20 samples fabricated with TiO_2 nanorods and nanowalls.

Table S1. Average photovoltaic parameters calculated from 20 samples fabricated with TiO_2 nanorods and nanowalls.

Samples	V_{OC} (V)	J_{SC} (mA/cm^2)	FF (%)	PCE (%)
TiO_2 nanorods	1.01 ± 0.01	20.0 ± 1.2	70.7 ± 3.8	14.7 ± 0.7
TiO_2 nanowalls	0.99 ± 0.01	16.0 ± 0.9	64.1 ± 3.2	10.3 ± 1.0

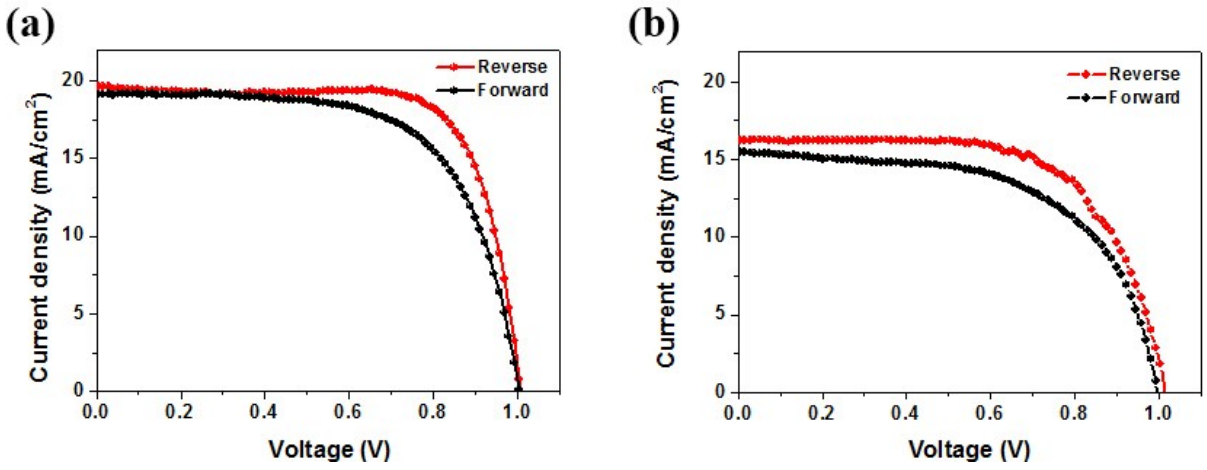

Fig. S5 Hysteresis of the *J–V* curves measured in forward and reverse scan direction (scan rate at 100 ms): (a) TiO_2 nanorods; (b) TiO_2 nanowalls.

Table S2. Photovoltaic parameters of perovskite solar cells obtained from TiO_2 nanostructures in the hysteresis measurement.

Sample	V_{OC} (V)	J_{SC} (mA/cm^2)	FF (%)	PCE (%)
TiO_2 NR, Forward	1.01	19.1	65.6	12.7
TiO_2 NR, Reverse	1.02	19.7	73.7	14.8
TiO_2 NW, Forward	1.00	15.5	59.1	9.2
TiO_2 NW, Reverse	1.01	16.2	67.8	11.1