Supporting Information

Impact of morphology of hydrothermally grown TiO_2 nanorods on electron transporting property in perovskite solar cells

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Keywords: Halide perovskite solar cells, monocrystalline semiconductor nanowires, nanostructured electron transporting layer, TiO_2 nanorods (TNRs), TiO_2 nanoparticles (TNPs), solvothermal synthesis, time-resolved photoluminescence.

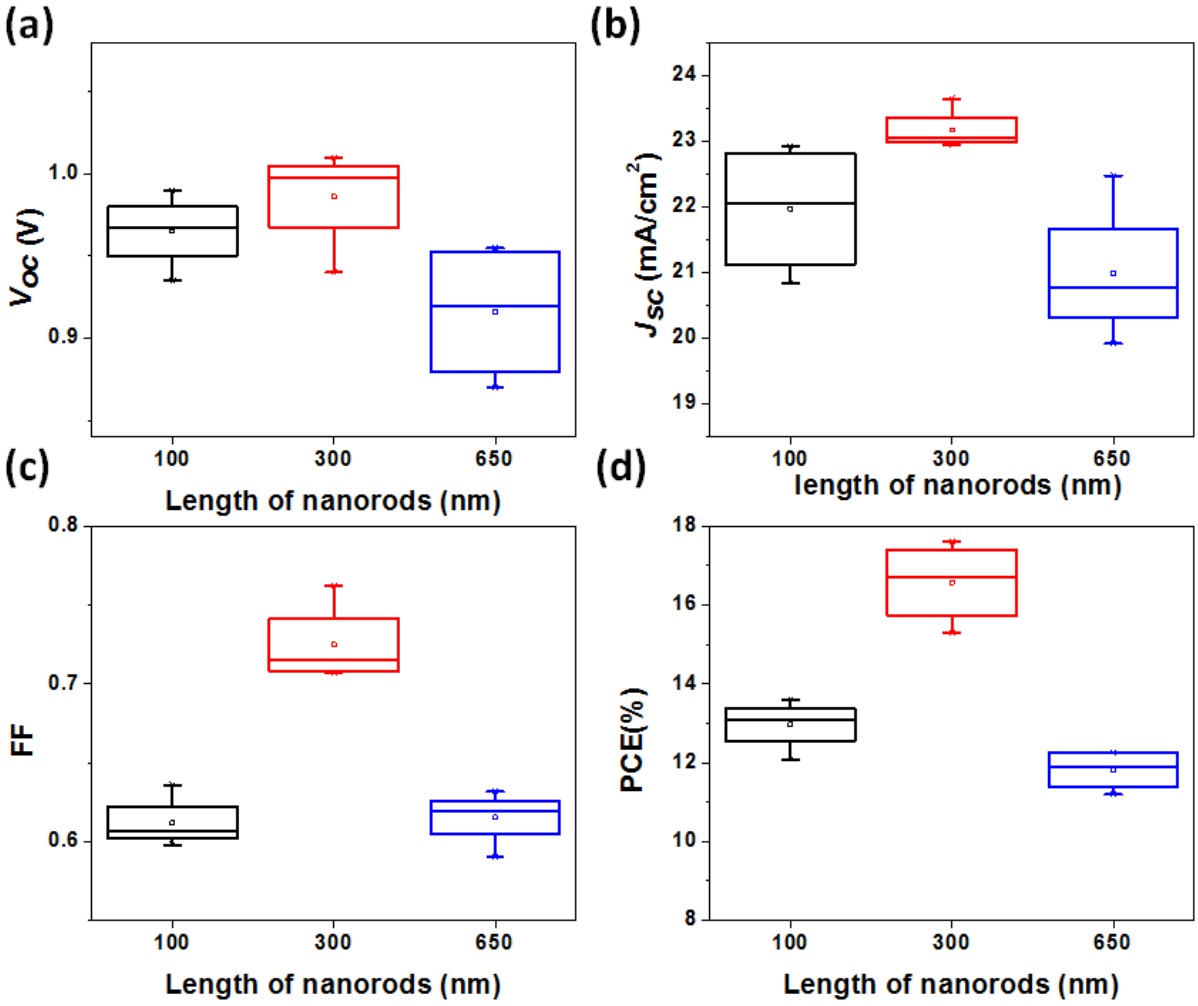
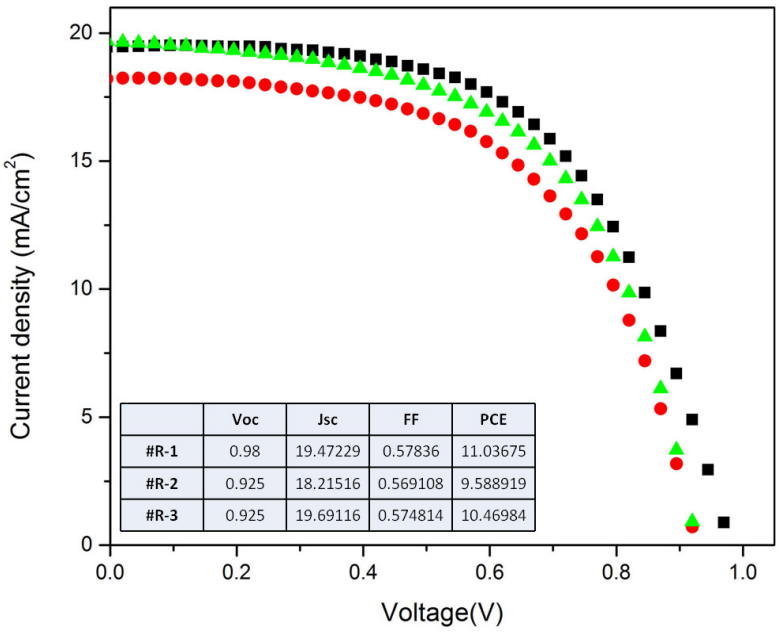


Figure S1. Summary of the performance of halide perovskite solar cells for different nanorod morphologies: (a) V_{oc}, (b) J_{sc}, (c) *FF* and (d) PCE. All the performance data were measured at AM 1.5G with an intensity of 100 mWcm^{-2}.



	Voc	Jsc	FF	PCE
#R-1	0.98	19.47229	0.57836	11.03675
#R-2	0.925	18.21516	0.569108	9.588919
#R-3	0.925	19.69116	0.574814	10.46984

Figure S2. J-V curves of halide perovskite solar cells constructed using nanorods ~ 150 nm in width and ~ 1 µm in length, formed using 1000 µl of TBO in the hydrothermal precursor solution. The data were measured at AM 1.5G with an intensity of 100 mW cm^{-2}.

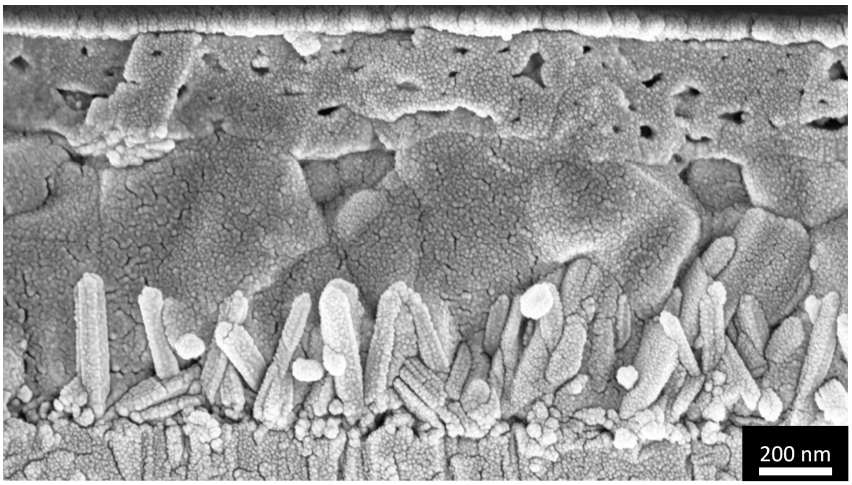


Figure S3. Cross-sectional FESEM image of PSC based on 300 nm long TiO_2 nanorods.

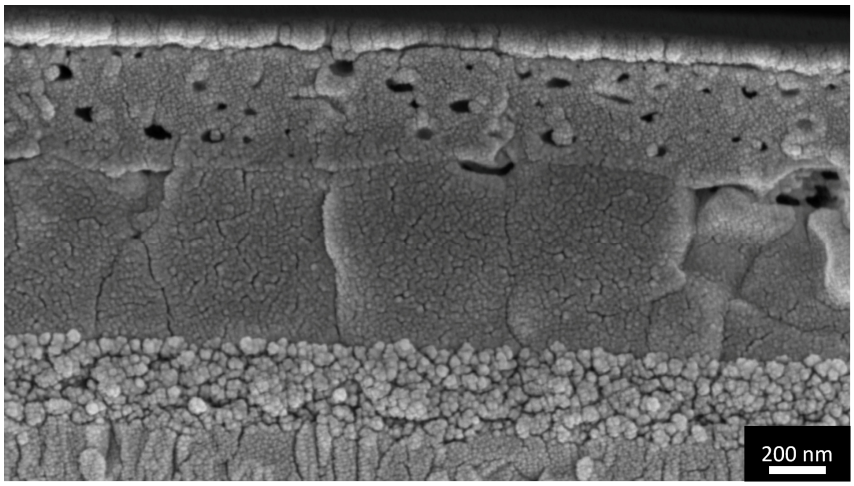


Figure S4. Cross-sectional FESEM image of PSC fabricated over 200 nm of mesoporous TiO_2.

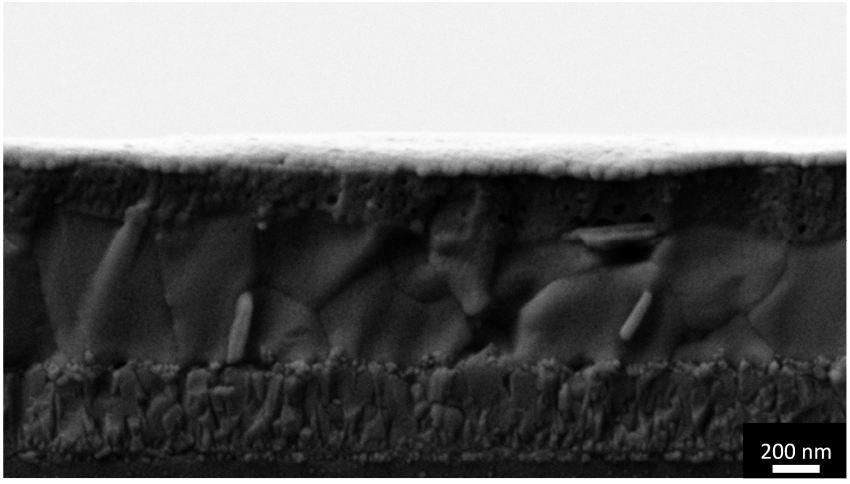


Figure S5. Cross-sectional SEM image of PSC fabricated over compact TiO_2.

Table S1. The fitting parameters for PL decays obtained for solar cells prepared from different electron transporting layers where, $I(t) = A_1\exp(-t/\tau_1) + A_2\exp(-t/\tau_2)$.

	τ_1 (ns)	τ_2 (ns)	R-squared	Reduced Chi-squared
Planar	2.4 (48 %)	0.42 (52 %)	0.9272	2.50E-05
TNPs	1.36 (35 %)	0.13 (65 %)	0.9726	7.18E-04
TNRs	0.27 (42 %)	0.09 (58 %)	0.9985	2.20E-05