Supporting Information

The construction of three-dimensional donor/acceptor interface based on bilayered titanium dioxide nanorod array-flower for perovskite solar cells

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Results

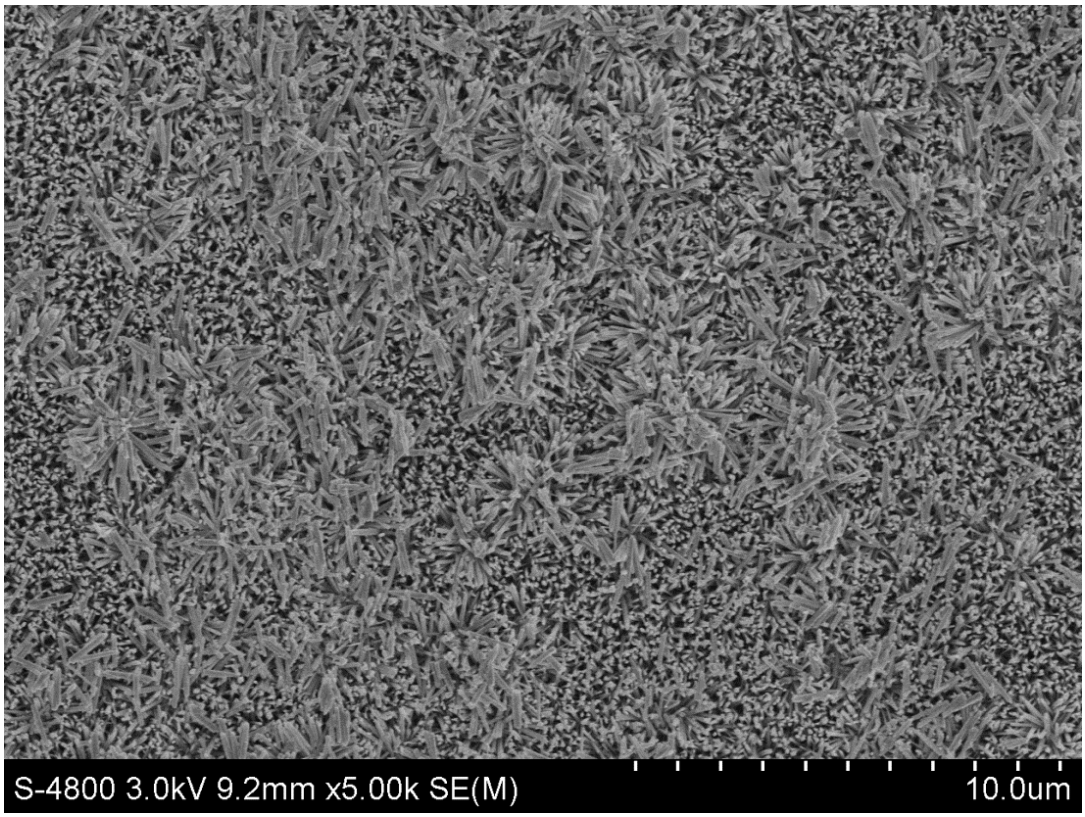

Figure S1. The TOP view of SEM image of the B-TiO_2-NAF

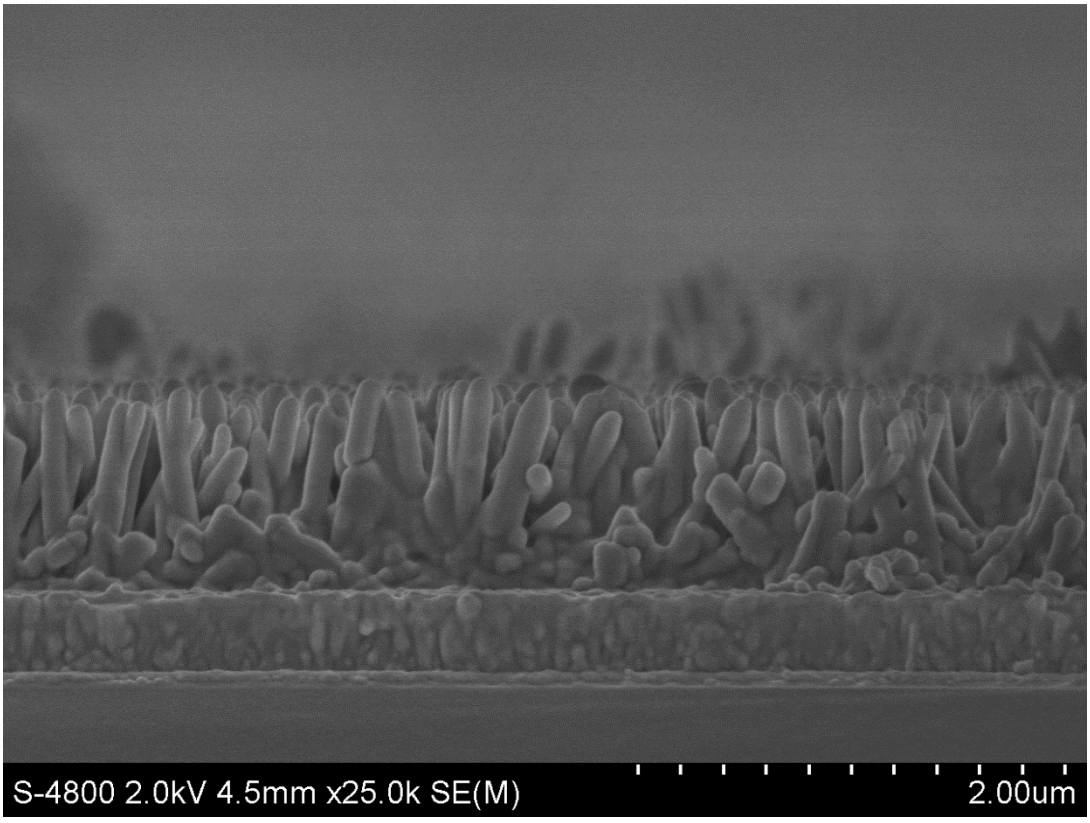

Figure S2. The cross section of SEM image of the B-TiO_2-NAF

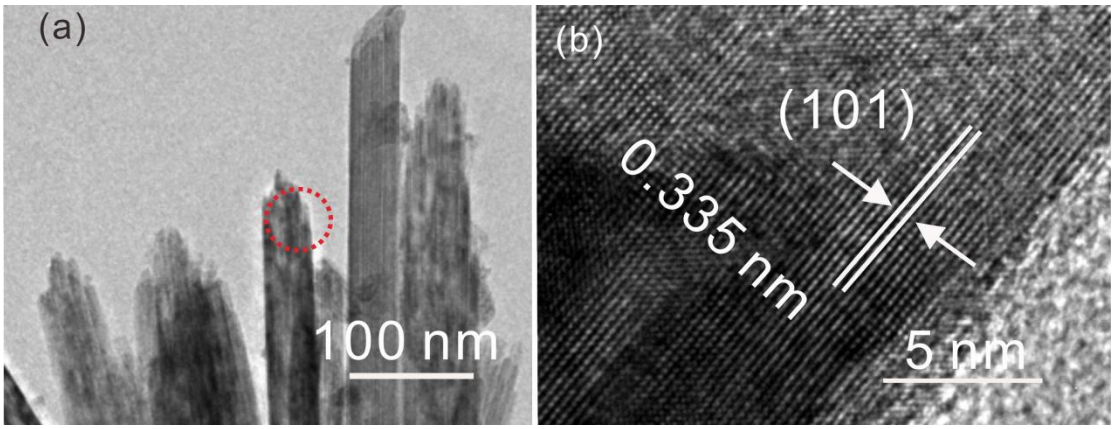

Figure S3. TEM Stripping from FTO (a) and HRTEM (b) images of the B-TiO_2-NAF.

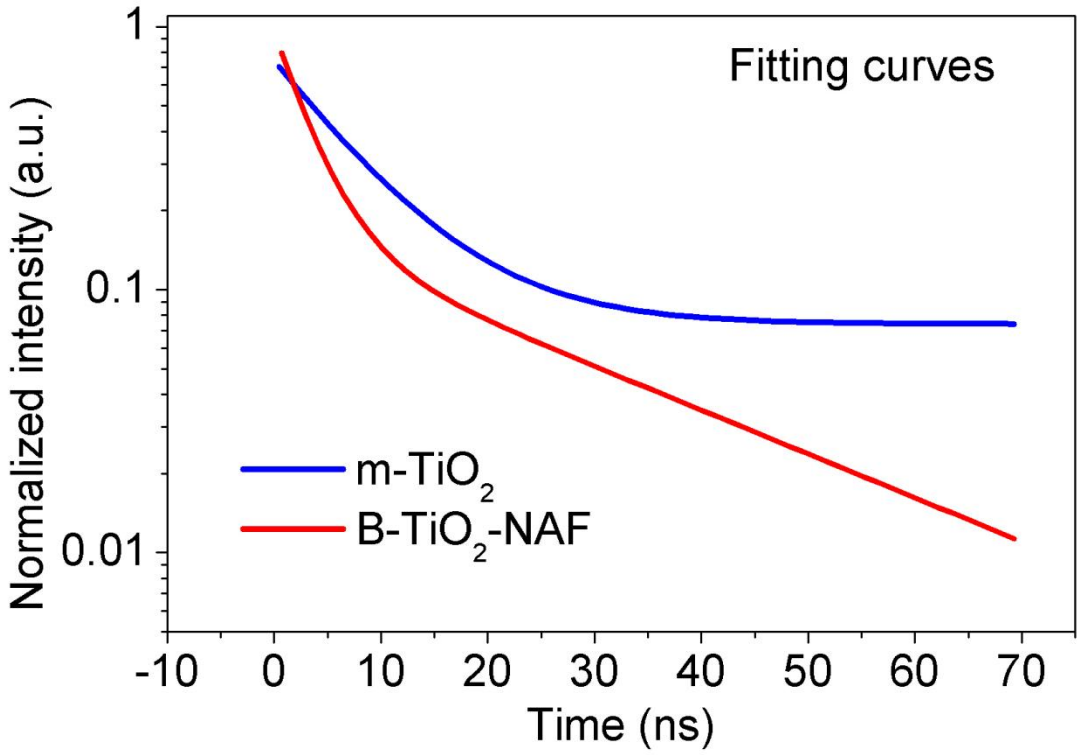

Figure S4. TR-PL fitting curves of the prevoskite film on B-TiO_2-NAF and m-TiO_2 substrates.

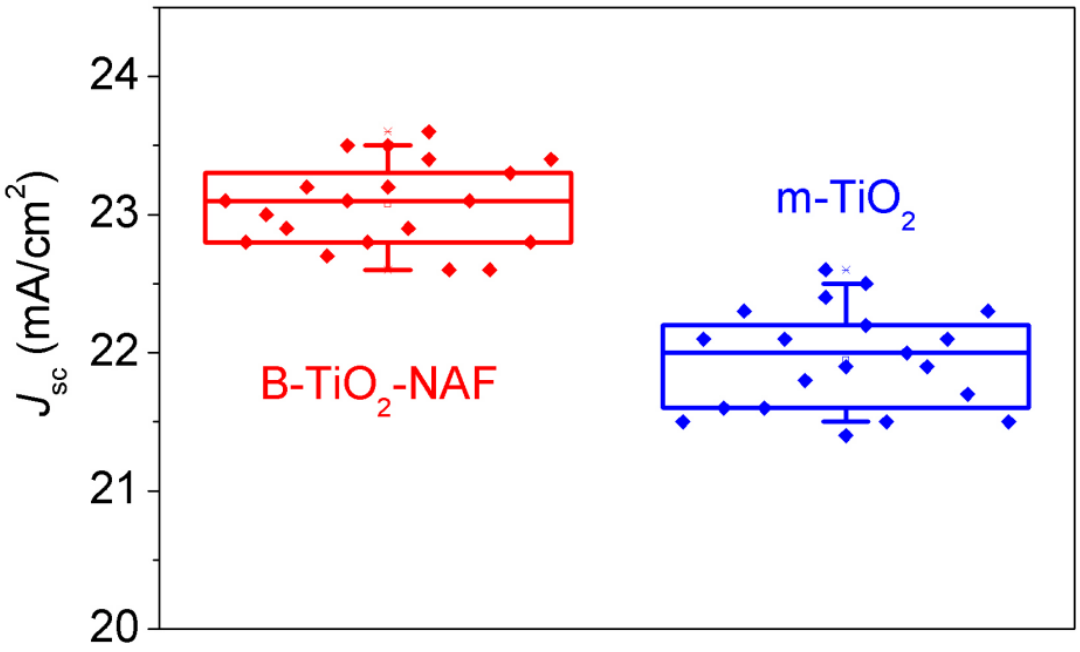

Figure S5. Statistics of J_{sc} distribution among 20 devices based on m-TiO_2 and B-TiO_2-NAF

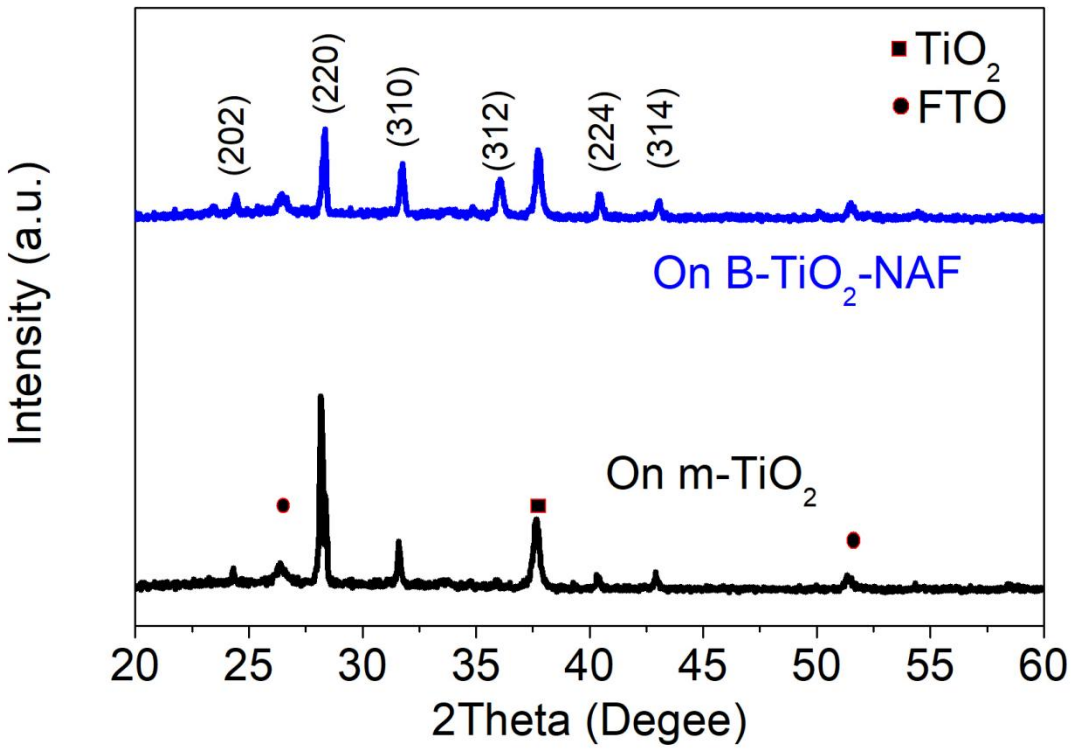

Figure S6. XRD patterns of $CH_3NH_3PbI_3$ on B-TiO_2-NAF/FTO and m-TiO_2 thin film.

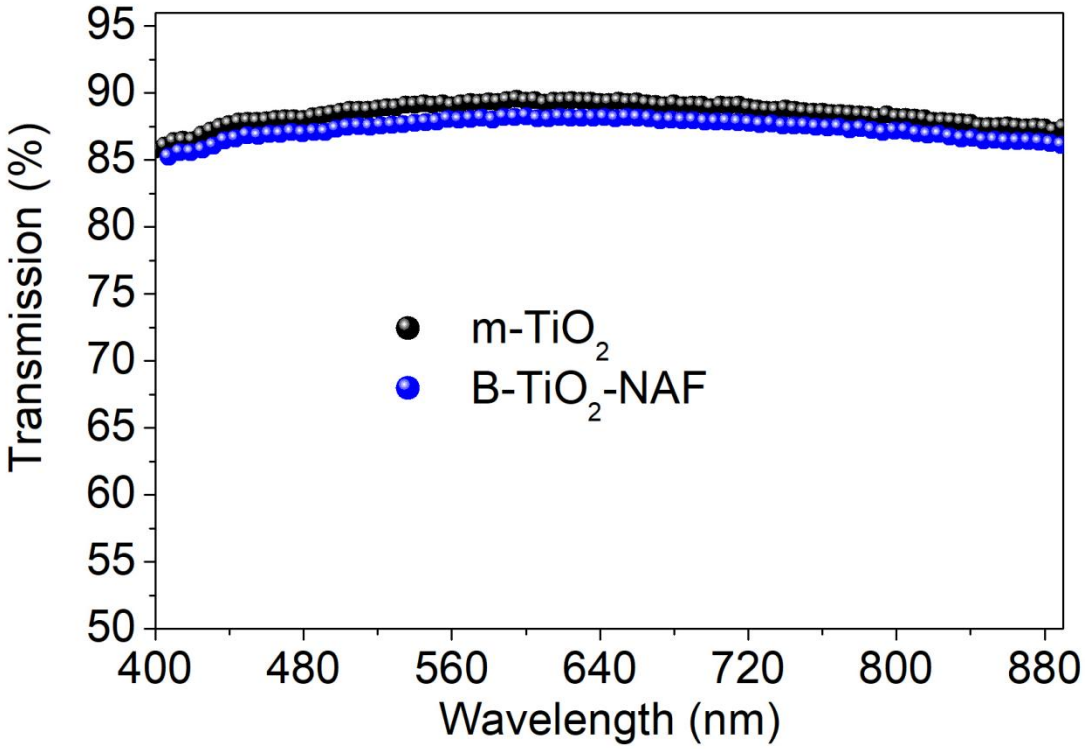

Figure S7. The transmittance spectra of the m-TiO_2 and B-TiO_2-NAF in thin film. [The transmissivity of B-TiO_2-NAF is slightly lower than that of m-TiO_2, indicating that both of them are good light transmitting materials]

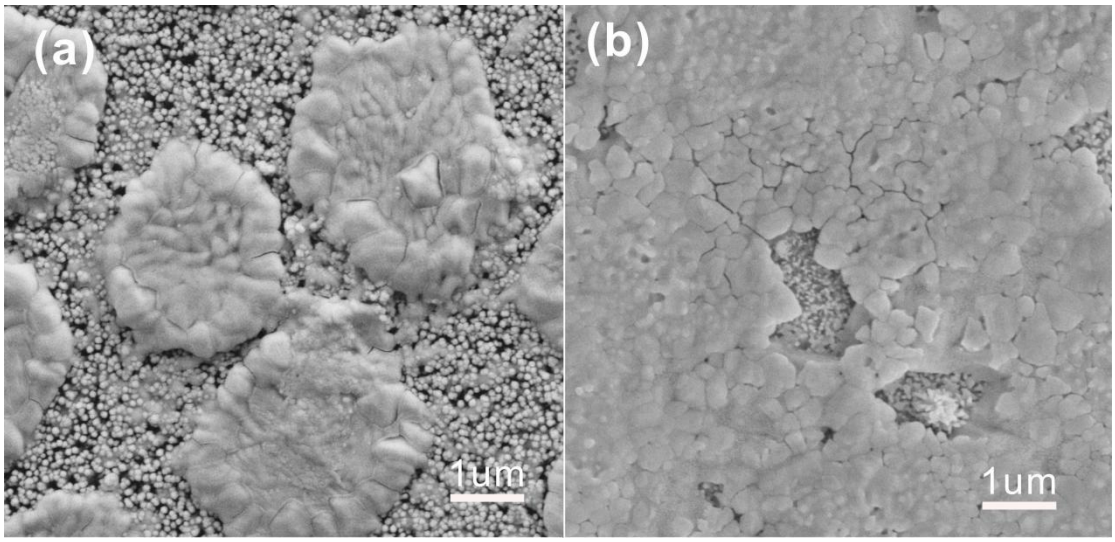

Figure S8. SEM images of $CH_3NH_3PbI_3$ on B-TiO_2-NAF/FTO (a) and m-TiO_2 (b) thin film.

[The $CH_3NH_3PbI_3$ grown on B-TiO_2-NAF/FTO form many large blocky crystals due to the bilayered structure. While the $CH_3NH_3PbI_3$ on m-TiO_2 shows the typical plane structure with the smaller crystal particle size.]

Table S1 The average performance of 20 devices

Device based on	V_{oc} (v)	J_{sc} (mA cm^{-2})	FF (%)	PCE (%)
m-TiO_2	1.07±1.02	22.0±0.51	81±1.12	19.4±0.61
B-TiO_2-NAF	1.11±1.01	23.1±0.62	82±1.08	21.2±0.42