Electronic Supplementary Information

For


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Fig. S1 Schematic illustration of the facile fabrication of aligned doubly open-ended TiO$_2$ nanotubes via a selective etching process for use in front-illuminated DSCs.

Fig. S2 XRD patterns of various electrodes. All electrodes are fabricated in same conditions of devices shown in Figure 3 and 5. The phase of freestanding doubly open-ended NT is identified our previous result.$^{[7]}$ The positions of A represent anatase phase of annealed NT.
**Fig. S3** HR-SEM images: Top and bottom surfaces of the NT arrays.

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Fig. S7 The incident photon-to-current efficiency (IPCE) spectra of sNP@NT-based DSCs.

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Fig. S9 Nyquist plots of sNP@NTs-based DSCs, measured at –0.69 V in the dark: comparison of immersion times (60 and 80 min).