

Electronic Supplementary Information

For

Doubly Open-Ended TiO₂ Nanotube Arrays Decorated With Few nm-Sized TiO₂ Nanoparticles for Highly Efficient Dye-Sensitized Solar Cells

Jongmin Choi,[‡] Young Soo Kwon[‡] and Taiho Park^{*}

Department of Chemical Engineering, Polymer Research Institute
Pohang University of Science and Technology, Pohang, 790-784 (Korea)

Table of Contents

1. **Fig. S1** Schematic illustration of the facile fabrication of aligned doubly open-ended TiO₂ nanotubes via a selective etching process for use in front-illuminated DSCs.
2. **Fig. S2** XRD patterns of various photoelectrode.
3. **Fig. S3** HR-SEM images: Top and bottom surfaces of the NT arrays.
4. **Fig. S4** Cross-sectional HR-SEM images of NT (a) and sNP@NT (b).
5. **Fig. S5** UV-Vis spectra of N719 dyes detached from the electrodes using 0.1 M KOH solution.
6. **Fig. S6** Intensities of N719 dyes detached from the various thicknesses of the NT electrodes using 0.1 M KOH solution.
7. **Fig. S7** The incident photon-to-current efficiency (IPCE) spectra of sNP@NT-based DSCs.
8. **Fig. S8** The photocurrent–photovoltage (J–V) properties of the sNP@NT-based DSCs: comparison of immersion times (60 and 80 min).
9. **Fig. S9** Nyquist plots of sNP@NTs-based DSCs, measured at –0.7 V in the dark: comparison of immersion

times (60 and 80 min).

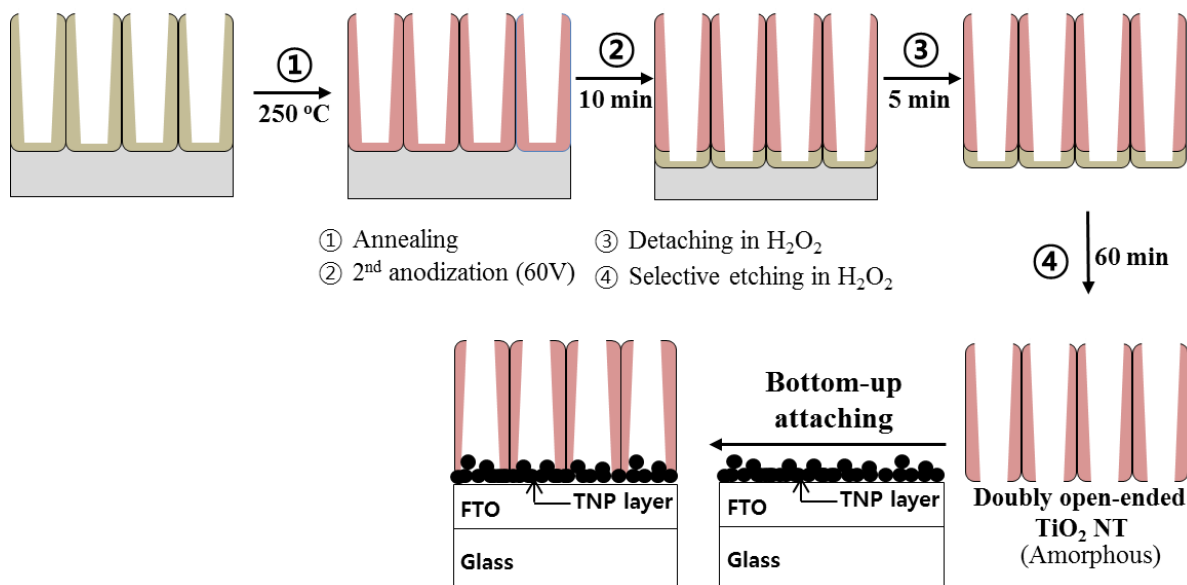


Fig. S1 Schematic illustration of the facile fabrication of aligned doubly open-ended TiO₂ nanotubes via a selective etching process for use in front-illuminated DSCs.

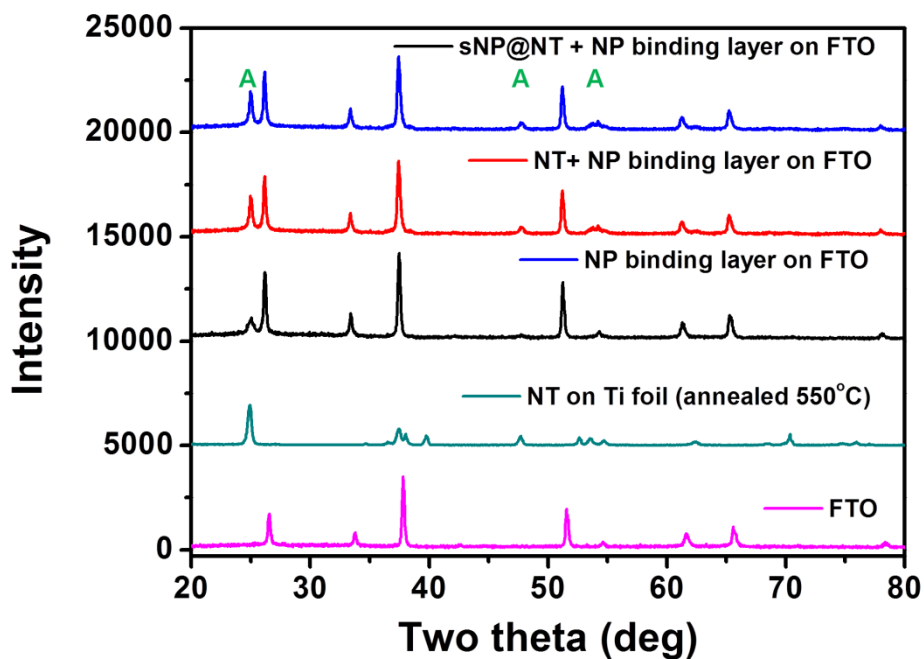


Fig. S2 XRD patterns of various electrodes. All electrodes are fabricated in same conditions of devices shown in Figureure 3 and 5. The phase of freestanding doubly open-ended NT is identified our previous result.^[7] The positions of A represent anatase phase of annealed NT.

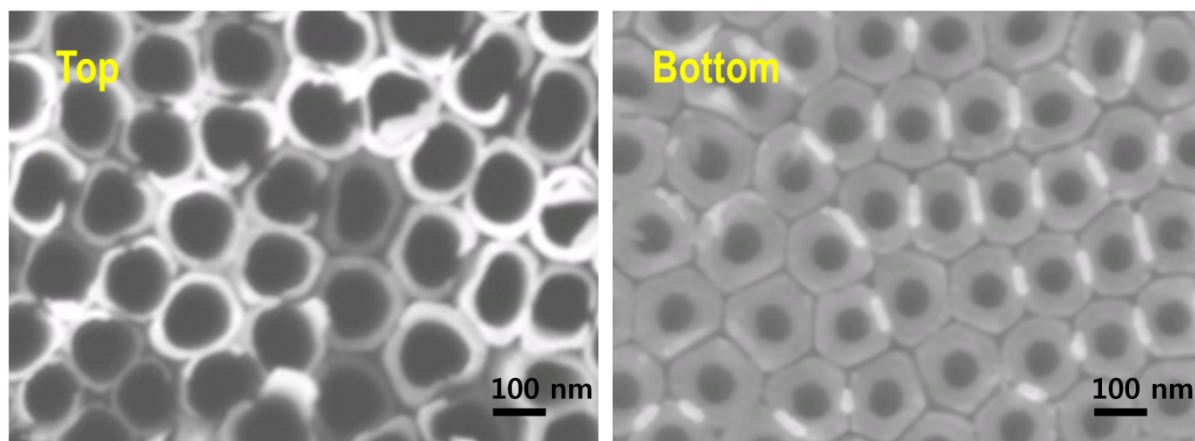


Fig. S3 HR-SEM images: Top and bottom surfaces of the NT arrays.

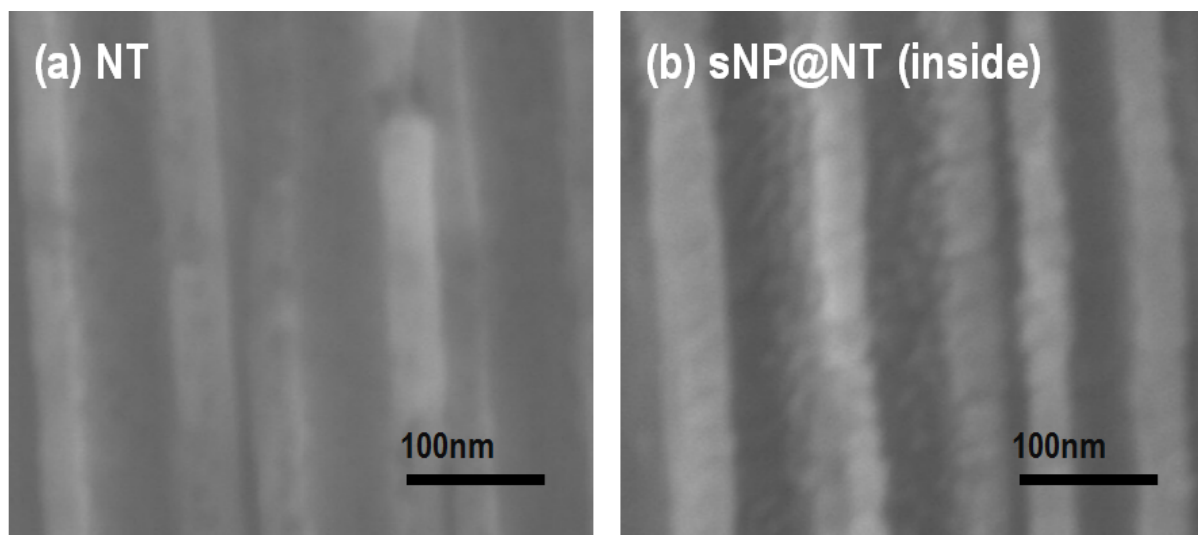


Fig. S4 Cross-sectional HR-SEM images of NT (a) and sNP@NT (b).

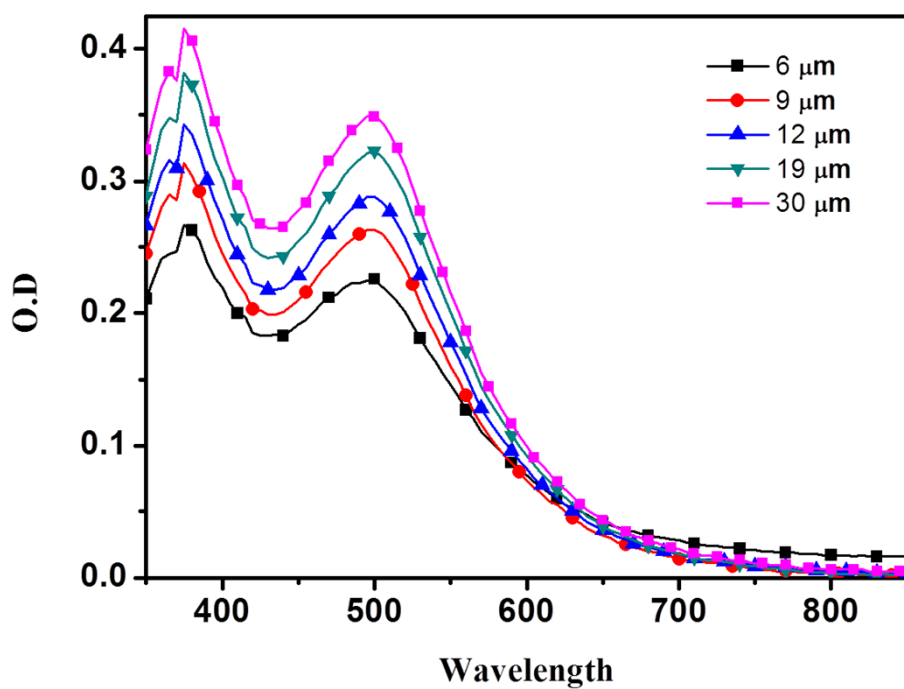


Fig. S5 UV-Vis spectra of N719 dyes detached from the electrodes using 0.1 M KOH solution.

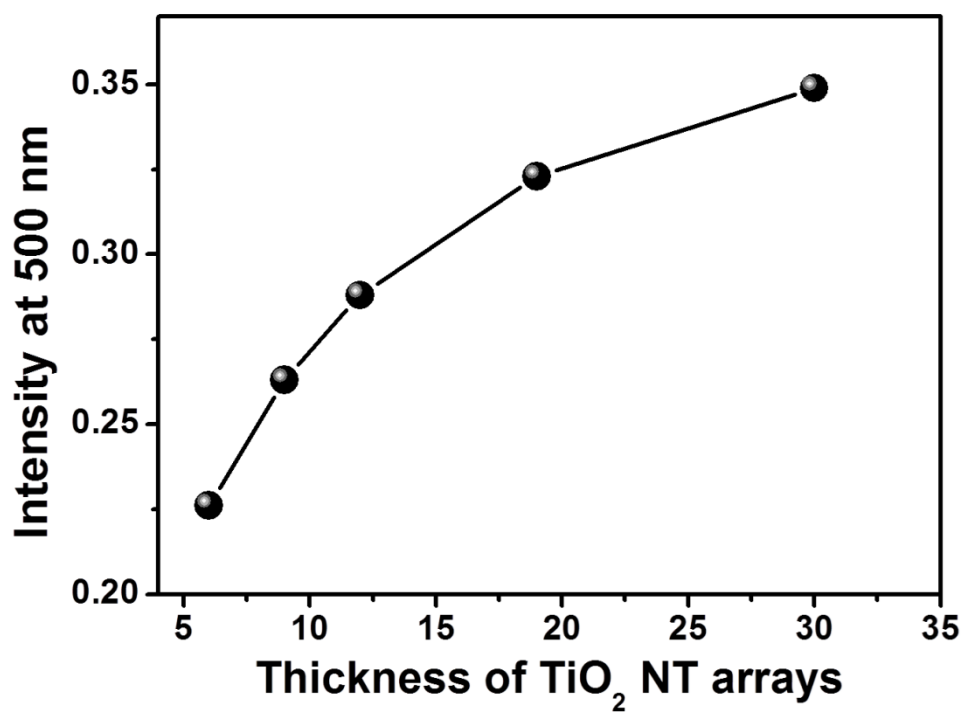


Fig. S6 Intensities of N719 dyes detached from the various thicknesses of the NT electrodes using 0.1 M KOH solution.

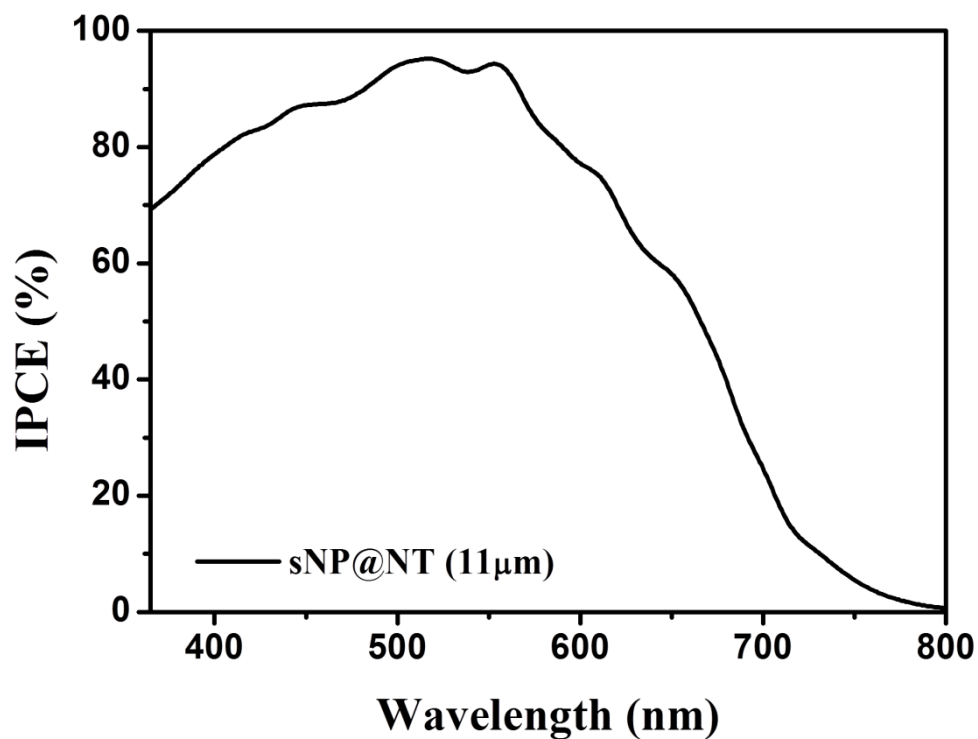


Fig. S7 The incident photon-to-current efficiency (IPCE) spectra of sNP@NT-based DSCs.

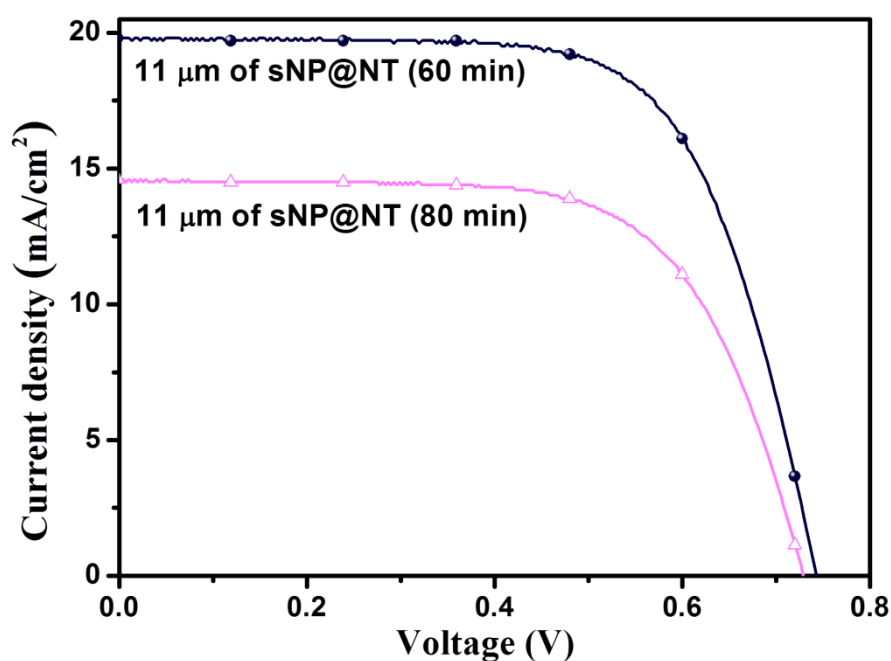


Fig. S8 The photocurrent-photovoltage ($J-V$) properties of the sNP@NT-based DSCs: comparison of immersion times (60 and 80 min).

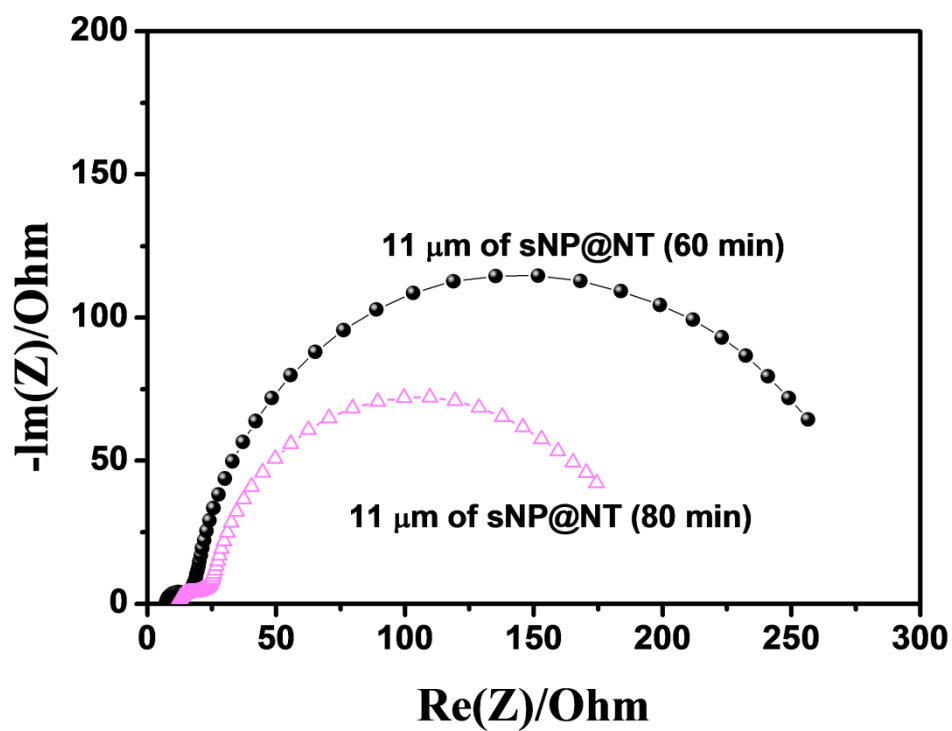


Fig. S9 Nyquist plots of sNP@NTs-based DSCs, measured at -0.69 V in the dark: comparison of immersion times (60 and 80 min).