

Fabrication of Long TiO₂ Nanotube Arrays in a Short Period Using a Hybrid Anodic Method for Highly Efficient Dye-sensitized Solar Cells

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Electronic Supplementary Information (ESI)

Supplementary Graphics

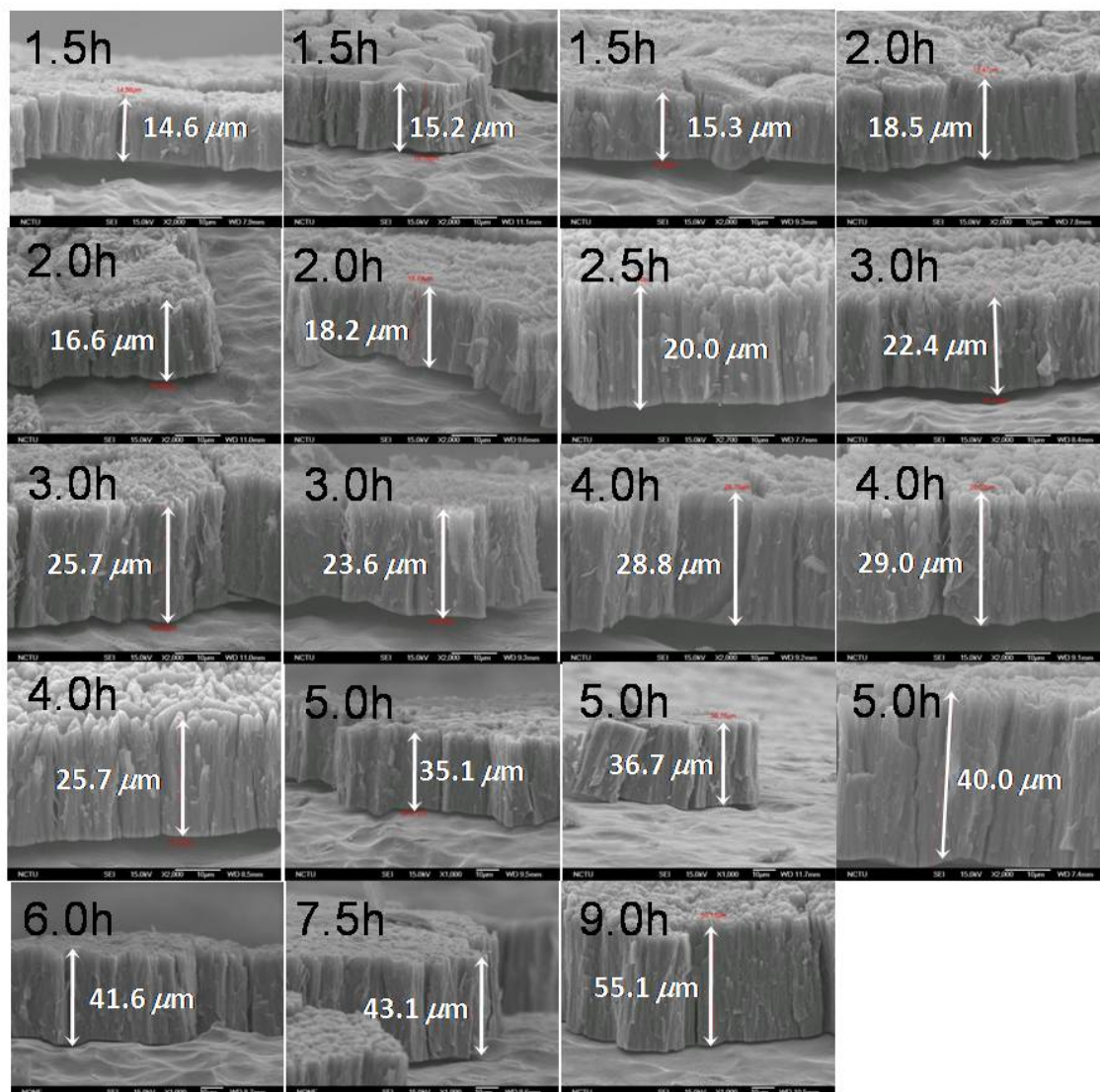


Fig. S1 SEM side-view images of TNT films fabricated with $t = 1.5 - 9.0$ h at the current density 3.7 mA cm^{-2} .

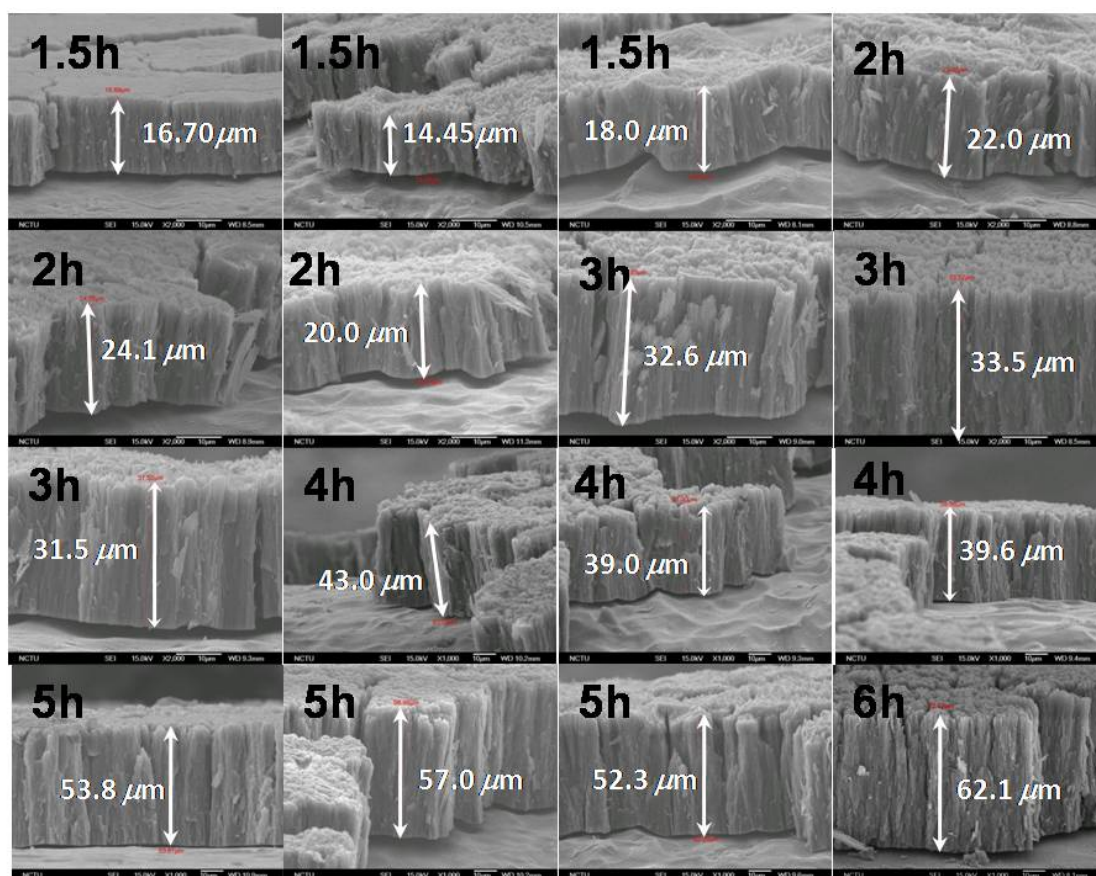


Fig. S2 SEM side-view images of TNT films fabricated with $t = 2.0 - 6.0$ h at the current density 5.6 mA cm^{-2} .

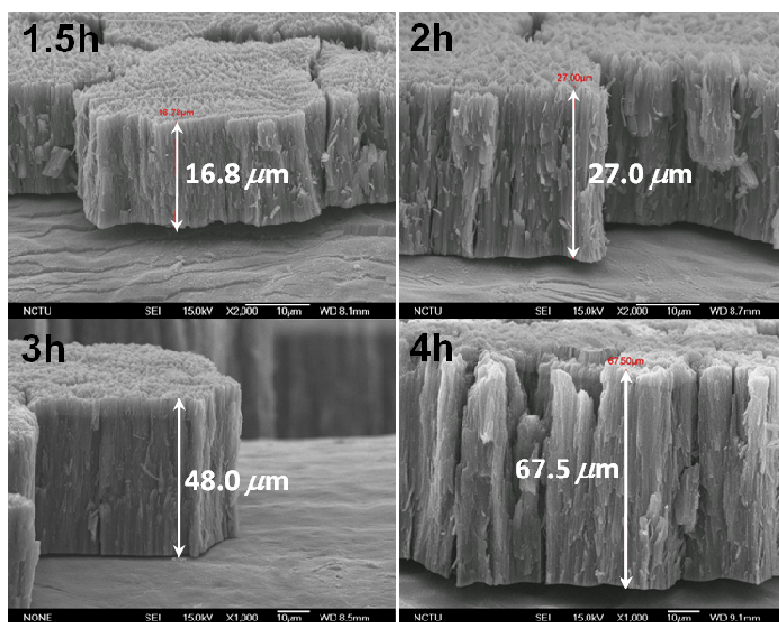


Fig. S3 SEM side-view images of TNT films fabricated with $t = 1.5 - 4.0$ h at the current density 7.5 mA cm^{-2} .

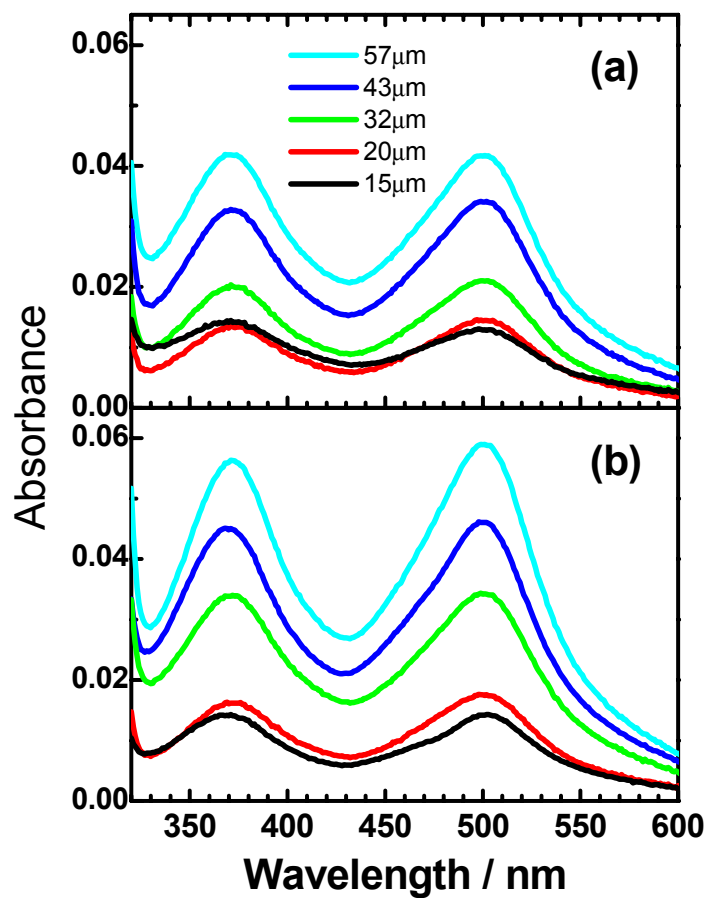


Fig. S4 UV-vis absorption spectra of N719/NaOH aqueous solutions desorbed from the corresponding 719-sensitized TNT films, (a) without TiCl_4 post-treatment and (b) with TiCl_4 post-treatment, to estimate the amount of dye loading for NT-DSSC devices showing the photovoltaic results in **Figs. 4** and **5**.

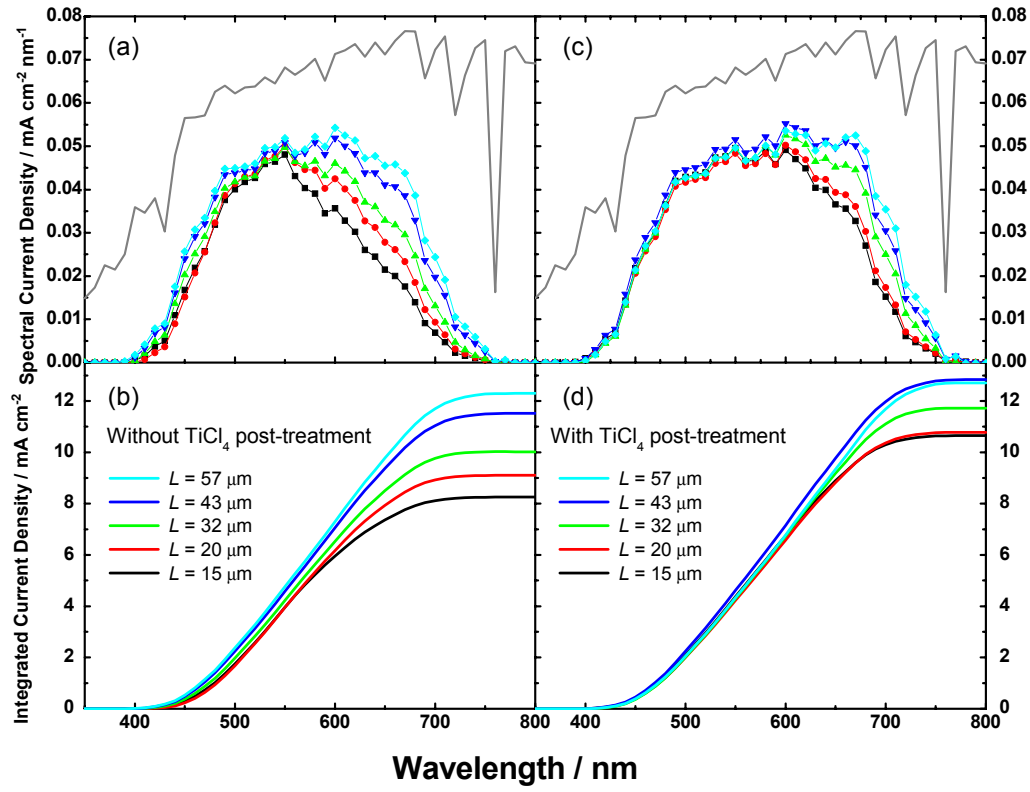


Fig. S5 (a)/(c) Corresponding spectral photocurrent densities of the same NT-DSSC devices as those shown in **Figs. 5a/b** obtained from multiplication of the AM-1.5 solar spectrum (gray curve) with IPCE values of NT-DSSC devices, i.e., $F(\lambda) \times \text{IPCE}(\lambda)$, at each wavelength. (b)/(d) Integrated photocurrent densities of NT-DSSC devices to estimate J_{SC} according to $J_{\text{SC}} = \int q \cdot \text{IPCE}(\lambda) \cdot F(\lambda) d\lambda$.