Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

High-yield Synthesis of "Oriented Attachment" TiO_2 Nanorods as a Superior Building Blocks of Photoanode in Quantum Dots Sensitized Solar Cells

*Wenjun Zhang, Xianwei Zeng, Huan Wang, Rui Fang，Yao Xu，Yanjun Zhang, Wei Chen**

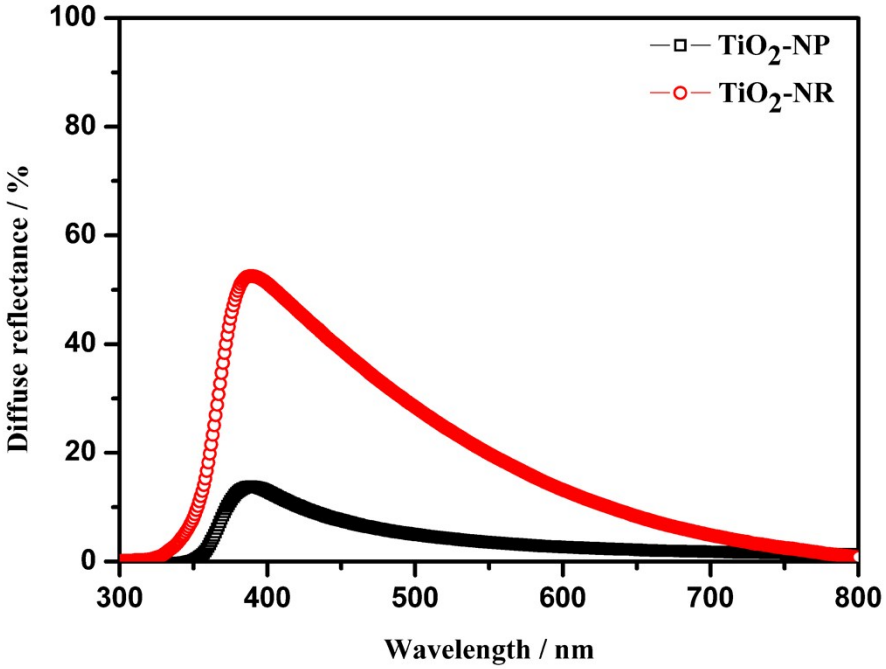

Figure S1. Diffuse reflectance spectra of the TiO_2-NP and TiO_2-NR films.

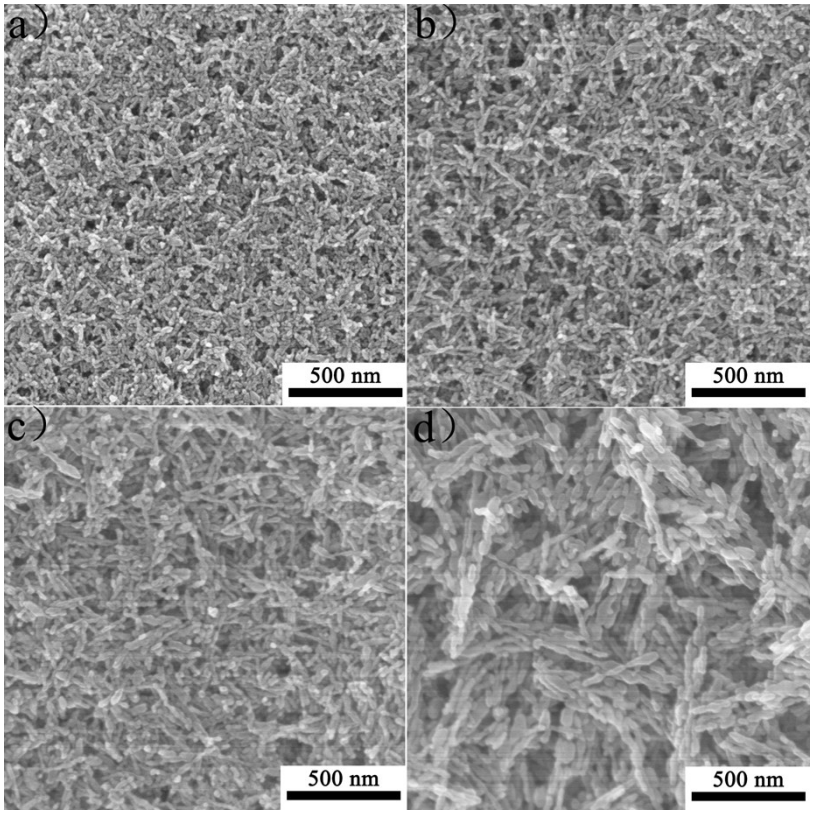

Figure S2. SEM images of the TiO2 nanorods obtained at higher TTIP concentrations (0.625 mol L^{-1}), the relative ratios between TMAH: TTIP a) 1:2, b) 2:3, c) 1:1, d) 3:2.

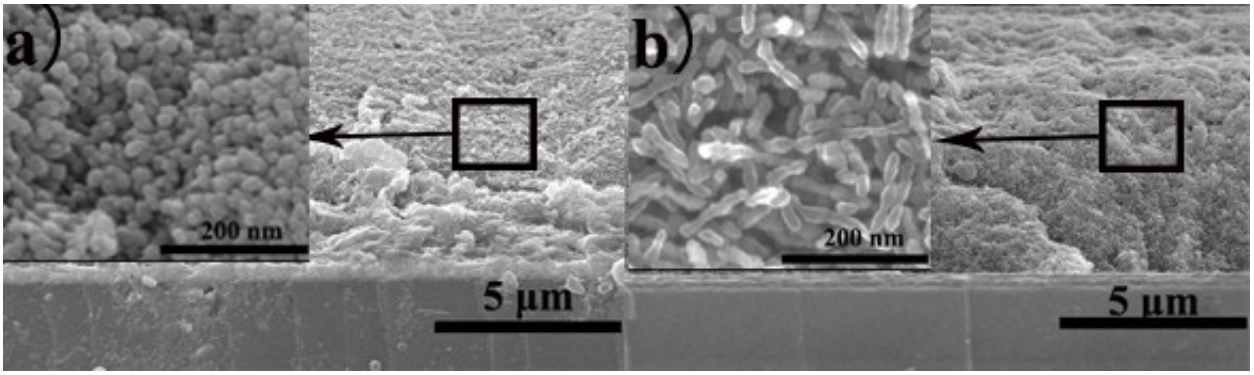

Figure S3. The cross-sectional SEM images of the photoanode films, a) TiO_2-NPs, b) TiO_2-NRs.

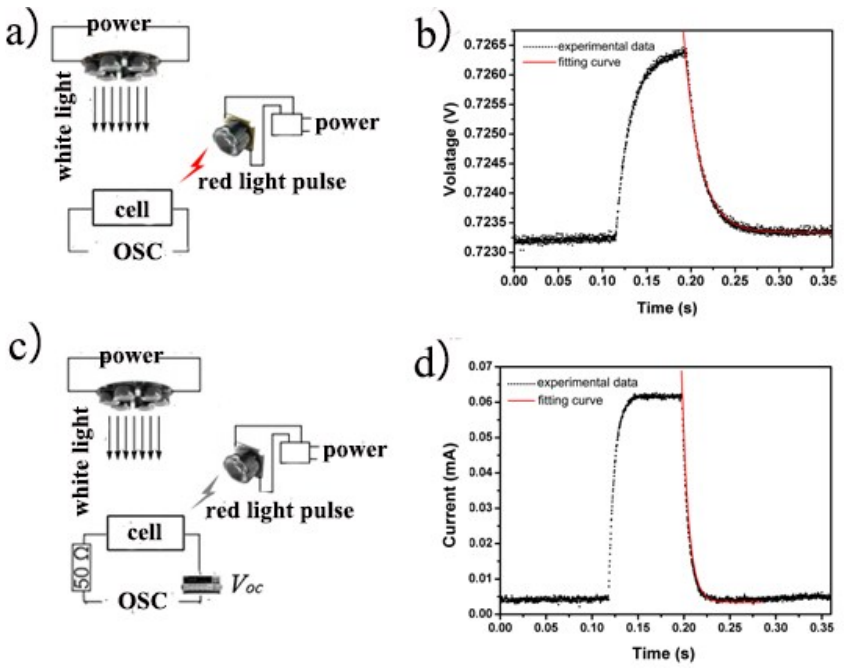

Figure S4. Schematic illustration of a) transient photovoltage decay measurement and c) transient photocurrent decay measurement; an exemplary show of b) photovoltage decay and d) photocurrent decay curves

For transient photovoltage decay measurement, QDSSC was exposed to the white bias light from an array of light emitting diodes (LEDs) to generate a photovoltage. A red light pulse (with the pulse width of 80 ms and the rise and fall time of 100 ns) from a LED controlled by a fast solid-state switch led to a small increase of the photovoltage. After the red light pulse was shut down, the increased photovoltage began to decay. The decay of such a photovoltage dynamics was recorded on a PC-interfaced Keithley 2400 source meter. By fitting the voltage decay signal, one could get the electron recombination lifetime (τ_r). In order to measure the transient photocurrent decay, V_{oc} of the DSSC under the white bias light was offset by a constant voltage that was exactly the same as V_{oc} while the polarity was opposite. A pulse of red LED resulted in a current flow through the external load, and the current decay dynamics on a 50 Ω resistor was recorded with the Keithley 2400 source meter. The perturbation signal was small enough that the

photocurrent decay could be fitted as a single exponential decay. The decay rate of current signal is corresponding to the electron transport time (τ), which could be gotten by exponential fitting of the decay signal. By varying the white light bias intensity, the recombination rate constant and electron diffusion rate constant could be estimated over a range of open circuit voltage which is equal to the electron quasi Fermi level of TiO_2 offset with respect to the electrolyte redox Fermi level ($_nE_F$-$E_{F,redox}$).