Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Supporting Information

Investigation on the Dynamics of Electron Transport and Recombination in TiO_2 Nanotube/Nanoparticle Composite Electrodes for Dye-sensitized Solar Cells

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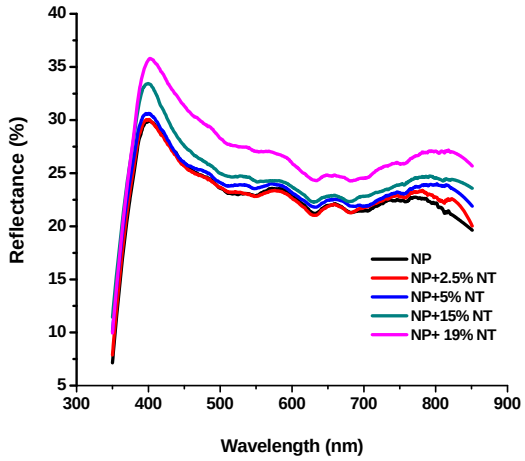

Figure S1 Reflectance spectra of bare composite TiO_2 films on TEC8 glass electrodes in air. The spectrophotometer used was an Avaspec2048-TEC UV-Vis-NIR with integrating sphere Avalight-DHS, collecting total (diffuse + specular) reflectance.

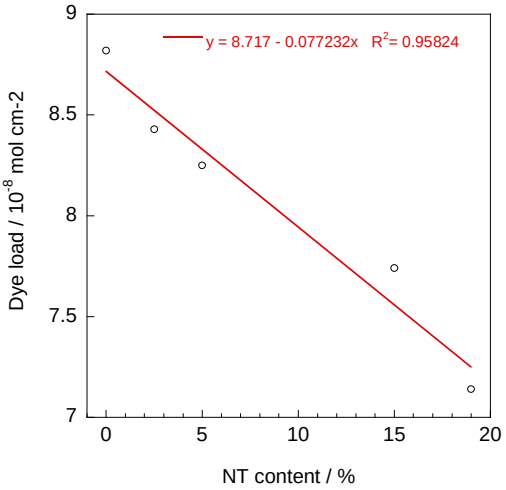

Figure S2 Amount of adsorbed N719 dye on composite TiO_2 electrodes (thickness 10 μm), determined by dye desorption. The drawn line is a linear regression fit.

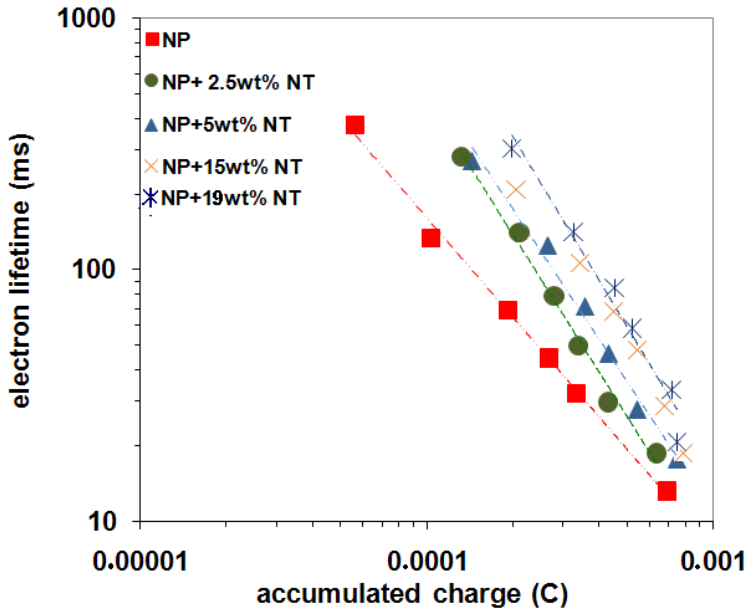

Figure S3 Dependence of electron lifetime on accumulated charge density under open-circuit conditions. Increase in NT content leads to increased lifetime at a given charge, because of the high trap density in the TiO_2 nanotubes. Note that the V_{OC} decreases with increased NT content.

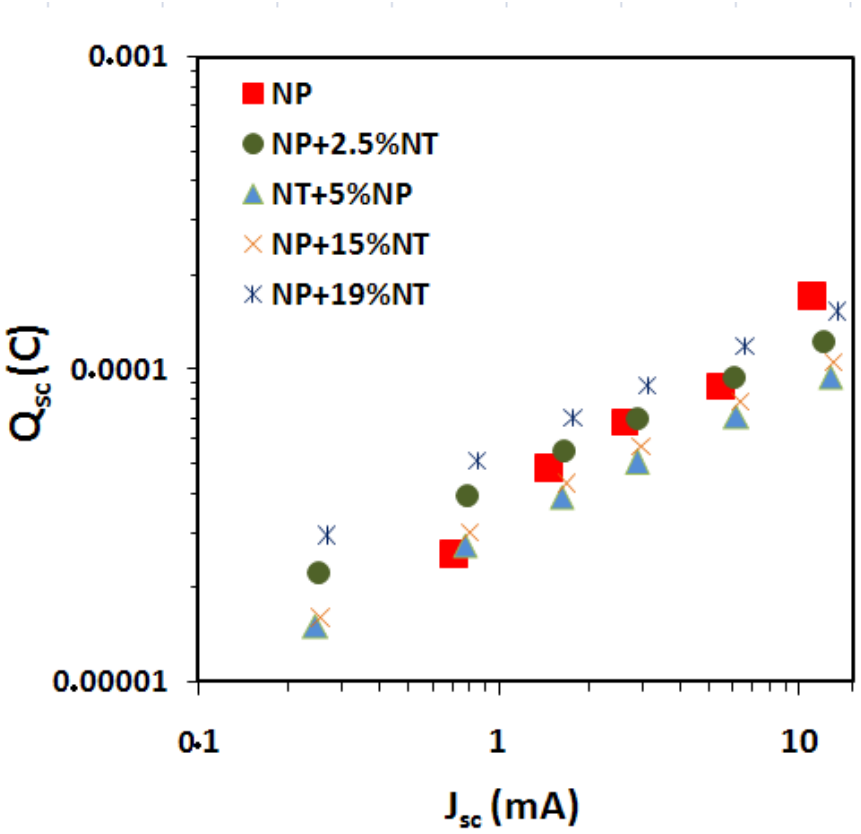

Figure S4 Extracted charge at short circuit condition as function of short circuit current of the solar cell based on NT/NP composite electrodes.

Table S1 Fitting parameters for the exponential trap distribution (Eq. 1, Fig. 3) in composite TiO_2 NT/NP electrodes.

Composition	g_0 (cm^{-3} eV^{-1})	m_c (meV)
NP	1×10^{15}	87
NP + 2.5 wt% NT	2×10^{15}	92
NP + 5 wt% NT	3×10^{15}	97
NP + 15 wt% NT	5×10^{15}	105
NP + 19 wt% NT	1×10^{16}	111