Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics


# Supporting Information

# Double-Layer Coating of $SrCO_3/TiO_2$ on Nanoporous $TiO_2$ for Efficient Dye-Sensitized Solar Cells

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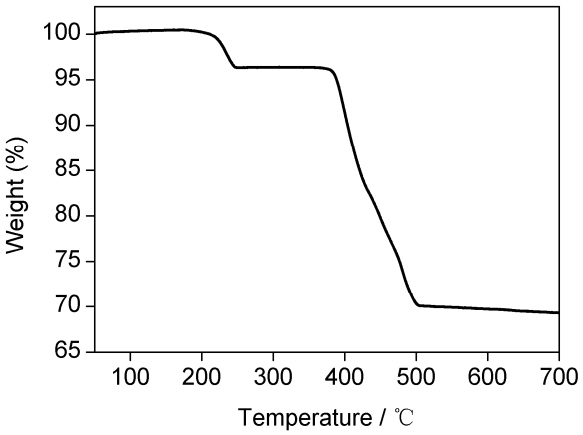


**Figure S1**. Thermogravimetric analysis (TGA) curve for strontium acetate hemi-hydrate.

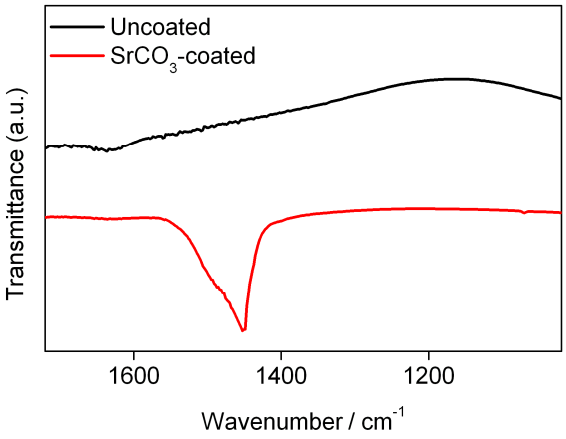


**Figure S2**. FTIR spectra for $SrCO_3$-coated and uncoated $TiO_2$ films

The measured Nyquist and Bode plots of IMPS/IMVS spectra for the $TiCl_4$-treated DSSCs as examples are shown in Figure S3 and Figure S4, respectively. The imaginary part value at the top of the semicircle of Nyquist plot corresponds to the peak value of the Bode plot. The transport time constant $\tau_d$ can be obtained from the frequency ($f_{IMPS}$) at the top of the semicircle in the Nyquist plots or the peak frequency in the Bode plots of IMPS by the relation:

$$\tau_d = \frac{1}{2\pi \cdot f_{IMPS}} \qquad \text{(S1)}$$

$$D_n = \frac{d^2}{\tau_d} \qquad \text{(S2)}$$

Then the diffusion coefficient could be obtained from the relation S2, where d is the film thickness.

For IMVS, electron lifetime ($\tau_n$) could be obtained from the relation S3:

$$\tau_n = \frac{1}{2\pi \cdot f_{IMVS}} \qquad \text{(S3)}$$

where $f_{IMVS}$ is the frequency at the top of the semicircle in the Nyquist plots or the peak frequency in the Bode plots of IMVS.

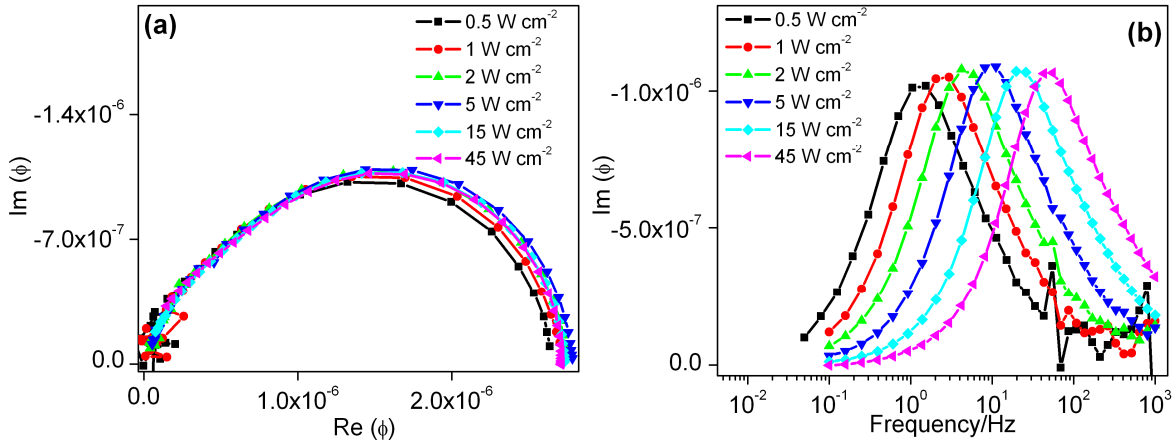


**Figure S3.** IMPS Nyquist (a) and Bode (b) plots for the DSSCs under 532 nm LED illumination with frequency ranging from 0.1 Hz to 10 kHz.

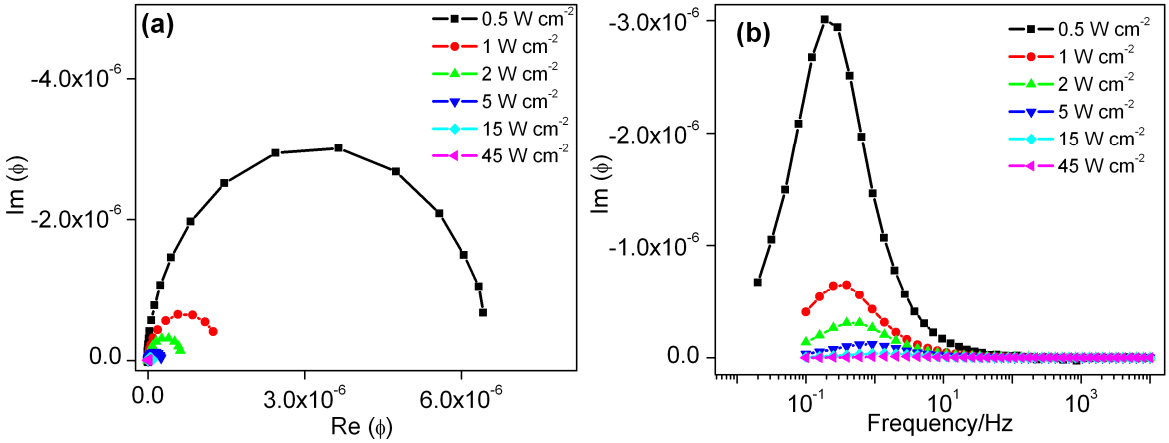


**Figure S4.** IMVS Nyquist (a) and Bode (b) plots of the DSSCs under 532 nm LED illumination with frequency ranging from 0.1 Hz to 10 kHz.