

# Supplementary Materials

## Tuning anatase-rutile phase transition temperature: $\text{TiO}_2/\text{SiO}_2$ nanoparticles applied in Dye-sensitized solar cells

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### SEM

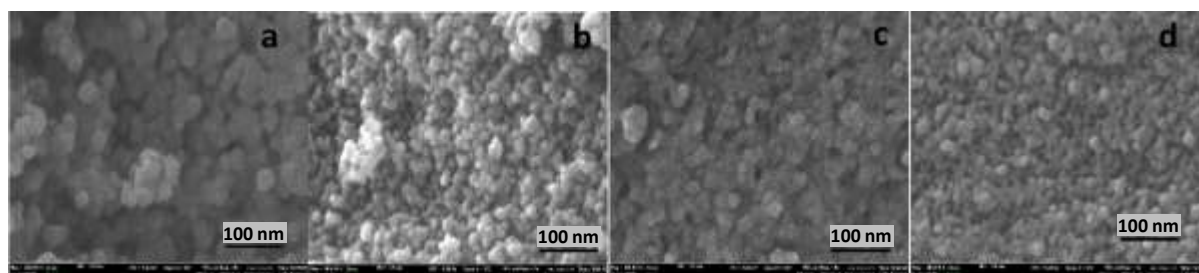


Figure S1: Scanning electron microscopy images of a) S0, b) S3, c) S5 and d) S10

Table S1: Carbon elemental analysis of the samples.

Sample	Molar % Ti	Molar % Si
S0	$98 \pm 3$	$2 \pm 1$
S3	$97 \pm 3$	$3 \pm 1$
S5	$94 \pm 3$	$6 \pm 2$
S10	$90 \pm 3$	$10 \pm 2$

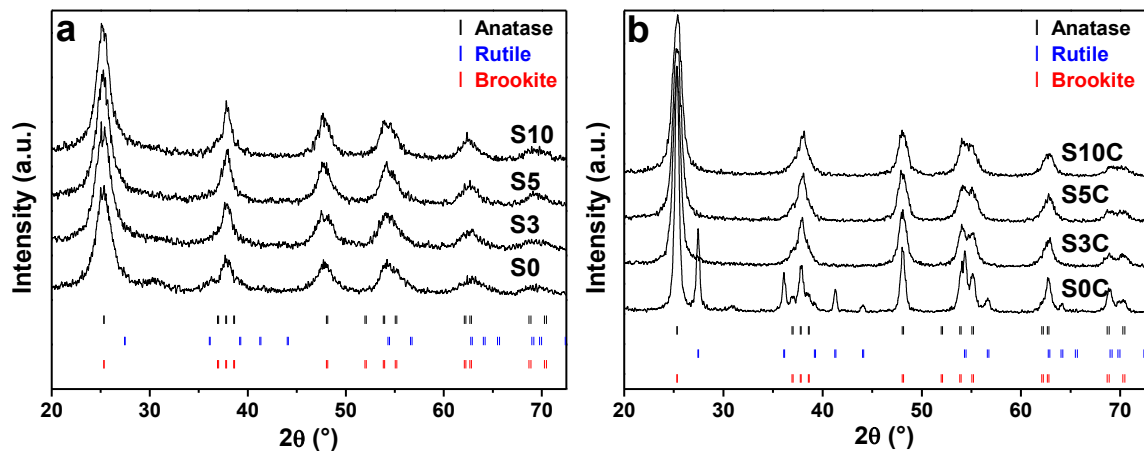
**XRD**

Figure S2: Diffraction patterns of the samples (a) before and (b) after thermal treatment at 500°C.

## Raman spectroscopy

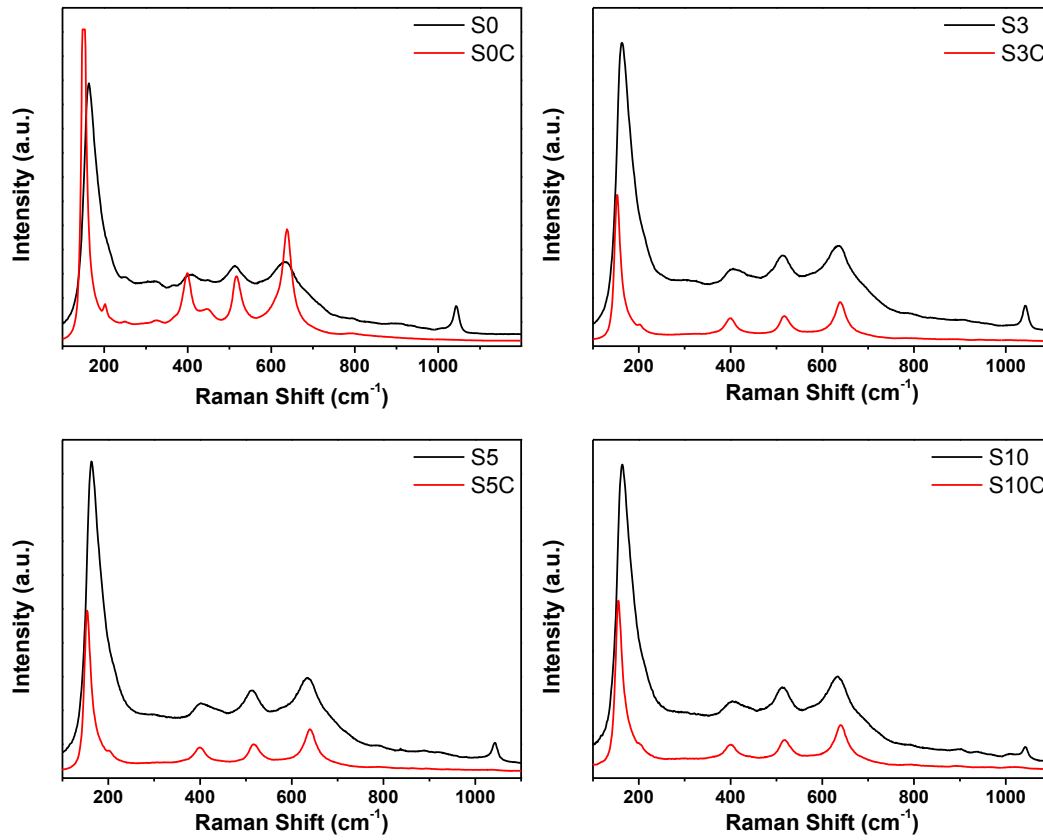


Figure S3: Raman Shift of S0, S3, S5 and S10 before and after thermal treatment.

## UV-Visible

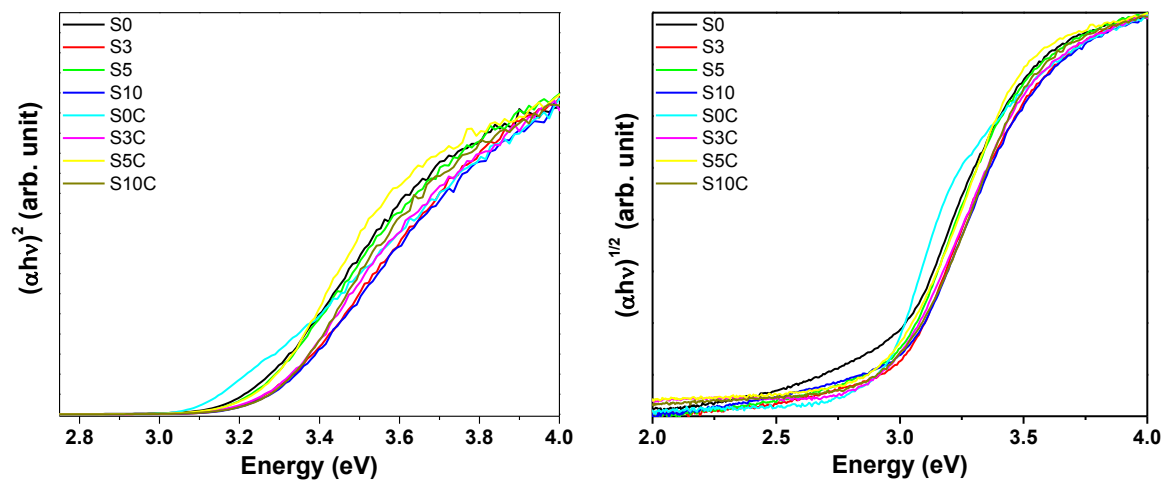


Figure S4: Direct (left) and indirect (right) Tauc Plot for S0, S3, S5 and S10.

Table S2: Direct and indirect band-gaps of the samples thermally treated at 500 °C.

Sample	Direct band-gap [eV]	Indirect band-gap [eV]
S0C	3.21	2.95
S3C	3.26	2.95
S5C	3.26	2.95
S10C	3.29	2.96

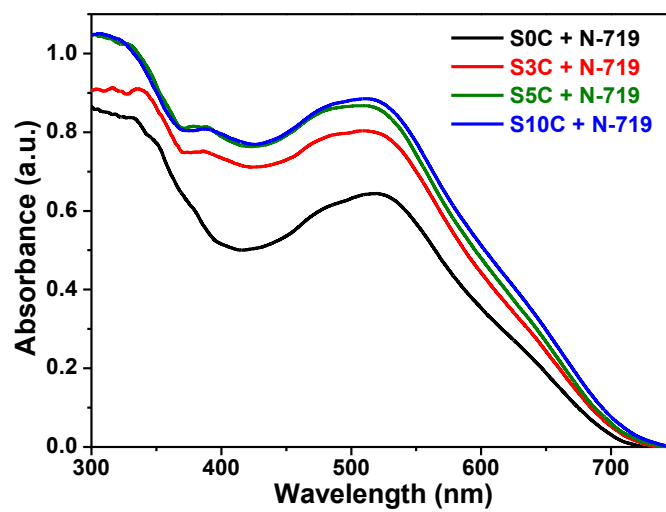


Figure S5: UV–Visible spectra of S0, S3, S5 and S10 thermally treated at 500 C and sensitized with N-719.