Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C

SUPPORTING INFORMATION

High Dielectric Rutile-Polystyrene Composite with Enhanced Percolative Threshold

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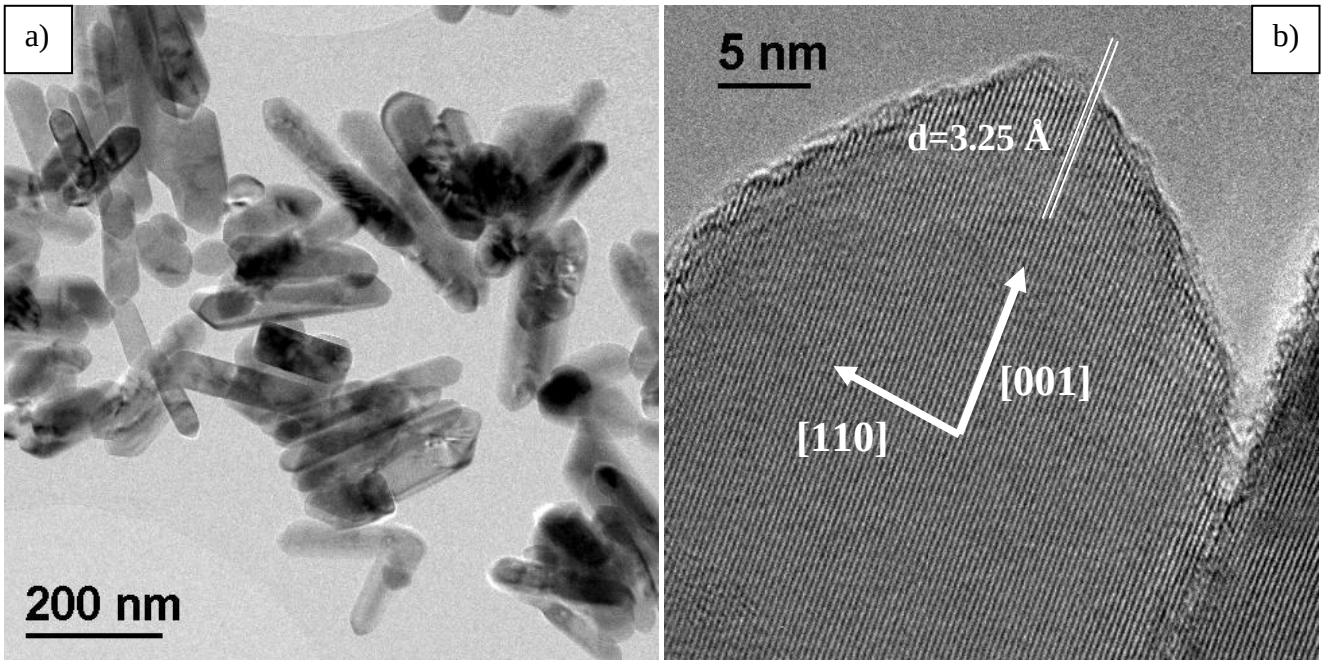

Fig. S1. TEM (a) and HRTEM (b) images of hydrothermally obtained rutile nanocrystals.

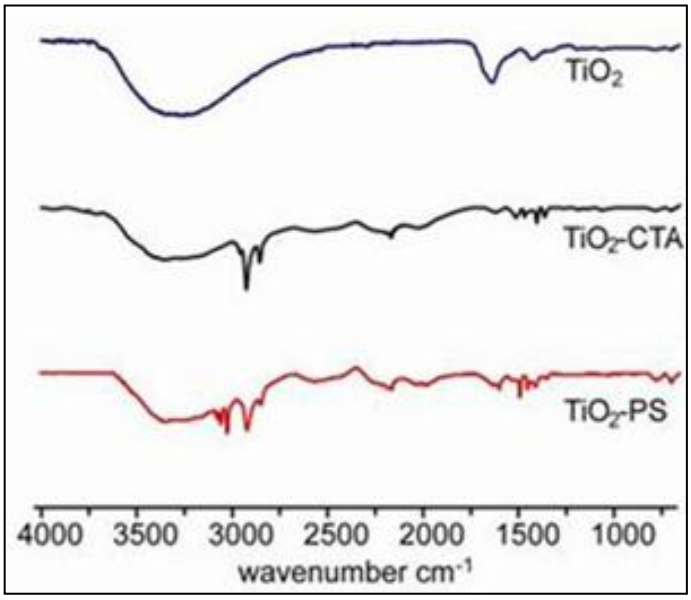

Fig. S2. FT-IR spectra of bare rutile nanoparticles, CTA grafted rutile nanoparticles (TiO_2-CTA) and PS grafted rutile nanoparticles (TiO_2-PS)

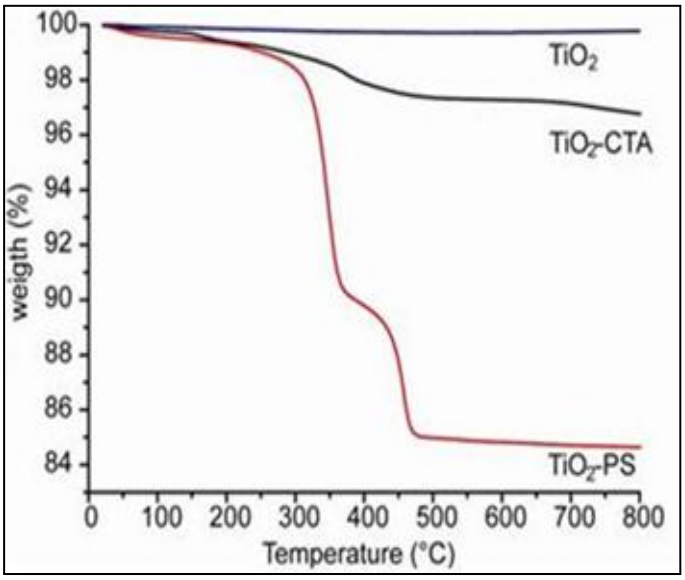

Fig. S3. TGA curves of bare rutile nanoparticles, CTA grafted rutile nanoparticles (TiO_2-CTA) and PS grafted rutile nanoparticles (TiO_2-PS)

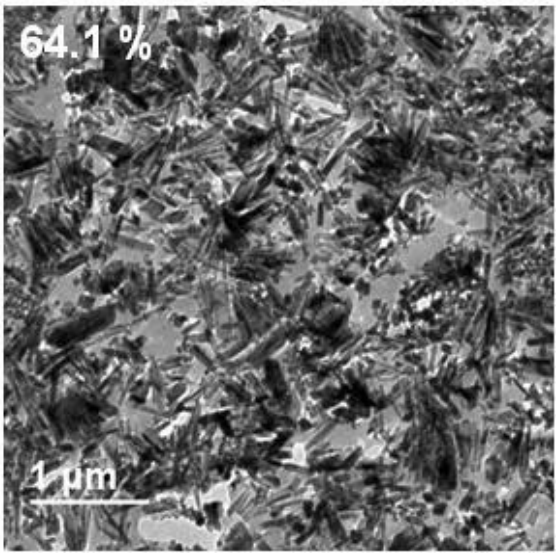

Fig.S4. TEM image of the TiO_2 PS composite with a 64.1% vol:vol of TiO_2.

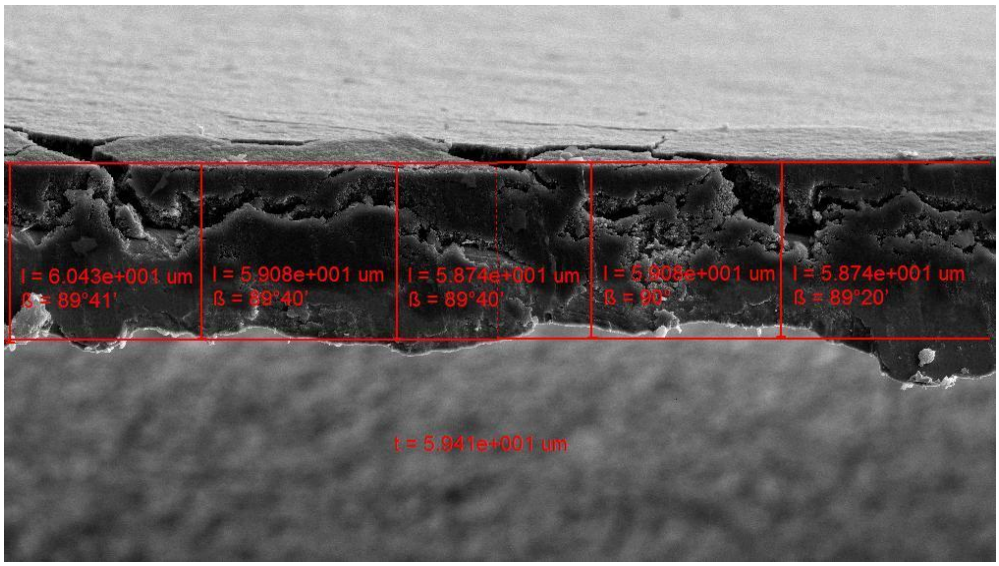

Fig.S5. SEM cross section of the TiO_2-PS composite film (36.9 % TiO_2**)** used for electric mesurements

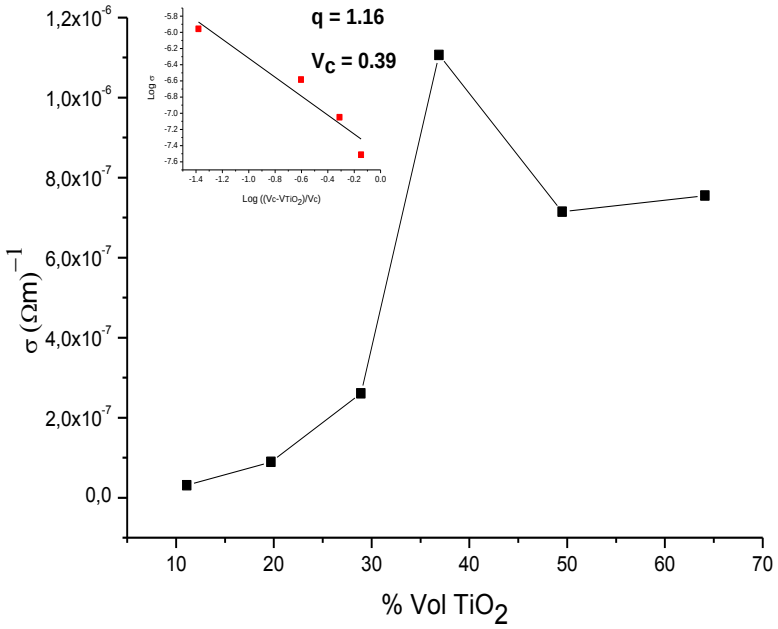

Fig. S6. Variation of the conductivity of TiO_2-PS composite vs. the volume fraction of TiO_2 at 10^4Hz. The inset shows the fitting of the σ to the Eq.1 using q, v_c and c as adjustable parameters.

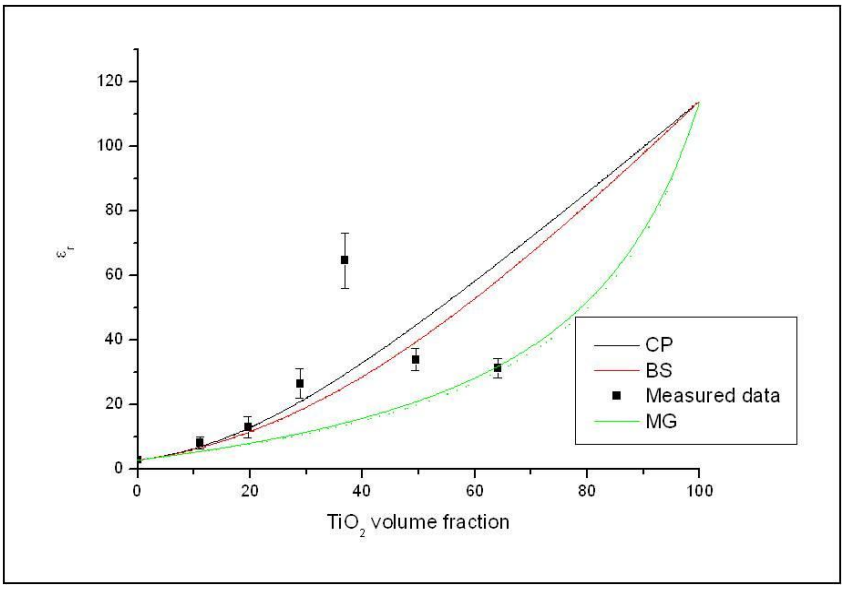

Fig. S7. Experimental values of the dielectric constant of TiO_2-PS composites at different filler loading. Curves represent the best fit according the mixing formulae in reference [19].

TiO_2-PS [mg]	PS Mi14 [mg]	TiO_2 % vol.	PS % vol.
230	0	64.1	35.9
180	18	49.5	50.5
135	34	36.9	63.1
95	48	28.9	71.1
65	59	19.7	80.3
35	70	11.1	88.9

Table S1. Amounts of TiO_2-PS and commercial PS used to prepare composites at different concentration. The relative volume fractions are calculated using 1.04 g/cm^3 and 4.17 g/cm^3 as PS and TiO_2 density, respectively.