Supplementary Material

Ultra-Low Percolation Threshold Induced by Thermal Treatments in Co-Continuous Blend-Based PP/PS/MWCNTs Nanocomposites

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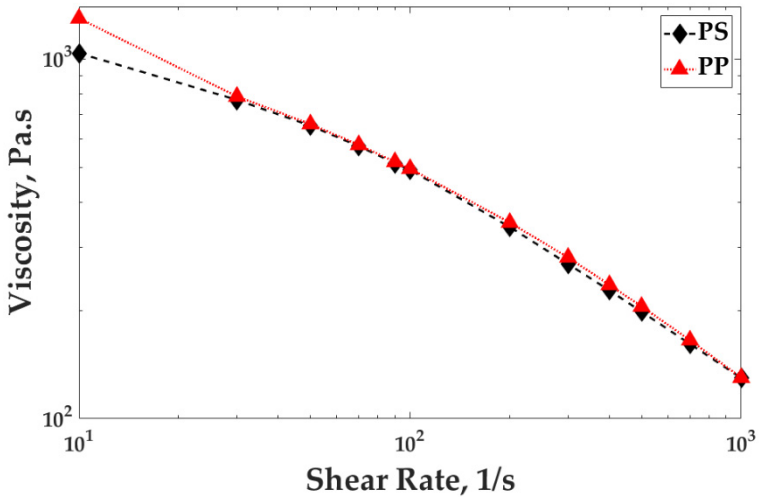


Figure S1. Viscosity as a function of shear rate measured by capillary rheometer for pure PP and PS.

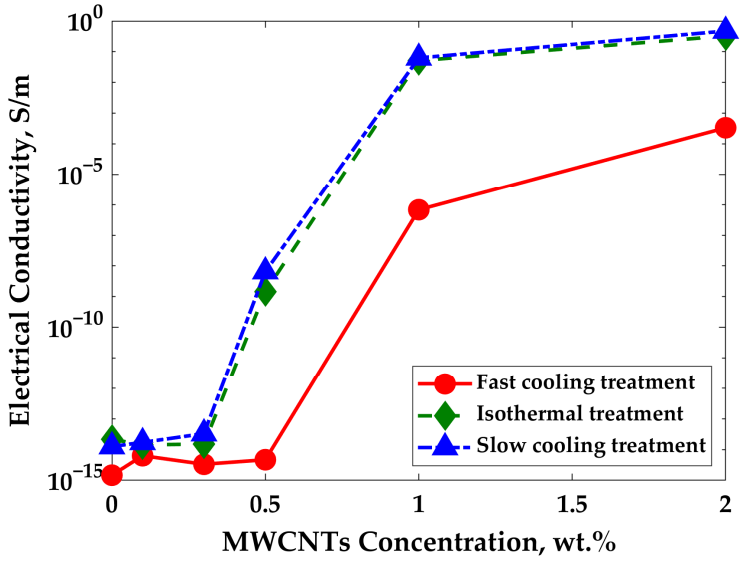
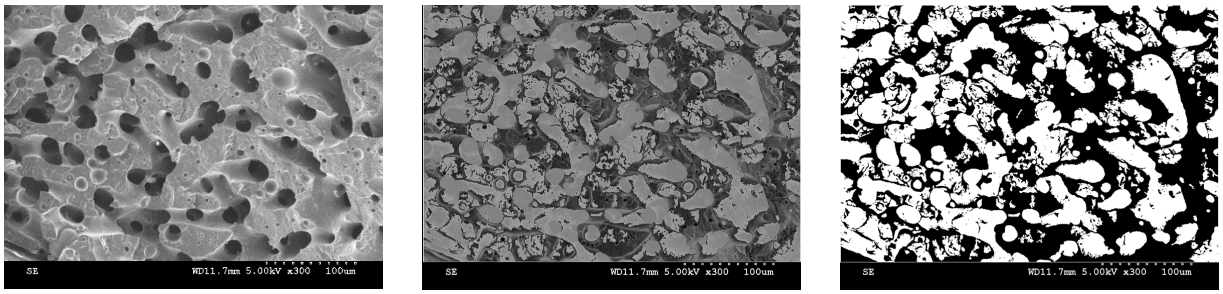


Figure S2. Effect of treatments on electrical conductivity as a function of MWCNTs concentration for PP/MWCNTs composites.

Table S1. Percolation threshold and fitting values of experimental data according to the equation 1 for PP/MWCNTs composites after each treatment.

Parameters	Fast cooling treatment	Isothermal treatment	Slow cooling treatment
p_c, wt.%	0.6	0.44	0.38
k, S/m	6.5×10^{-5}	0.15	0.17
t	4.9	1.8	2.1
R^2	1	0.95	0.93



(**a**) (**b**) (**c**)

Figure S3. Image treatment analysis for distinguishing between two phases: (**a**) original SEM picture for PP/PS/MWCNTs composite with 0.3 wt.% of MWCNTs; (**b**) image phase separation; (**c**) final treated image which was used for the estimation of L_{int} - interface length between two phases, which in this case is the perimeter of white phase.

Table S2. Melting and crystallization temperatures, onset and end of crystallization and degree of crystallinity for PP/MWCNTs and PP/PS/MWCNTs nanocomposites.

Material	CNTs amount, wt.%	Peak of Tm, °C	Peak of Tc, °C	Onset Tc, °C	End Tc, °C	Xc, %
PP/CNTs	0	166 ± 0.2	112 ± 0.1	117 ± 0.2	107 ± 1.2	47 ± 0.09
	0.1	165 ± 0.2	121 ± 0.1	126 ± 0.2	118 ± 0.1	48 ± 0.08
	0.3	166 ± 0.3	124 ± 0.2	128 ± 0.1	120 ± 0.2	47 ± 0.1
	0.5	167 ± 0.9	126 ± 0.2	130 ± 0.1	121 ± 1.2	49 ± 1.8
PP/PS/CNTs	0	166 ± 0.5	117 ± 0.1	122 ± 0.1	113 ± 0.1	52 ± 1.4
	0.1	165 ± 1.3	119 ± 0.2	123 ± 0.1	114 ± 0.4	51 ± 0.2
	0.3	167 ± 0.3	121 ± 0.2	126 ± 0.5	116 ± 0.1	48 ± 0.8
	0.5	168 ± 0.2	122 ± 0.2	127 ± 0.4	117 ± 0.1	52 ± 0.6

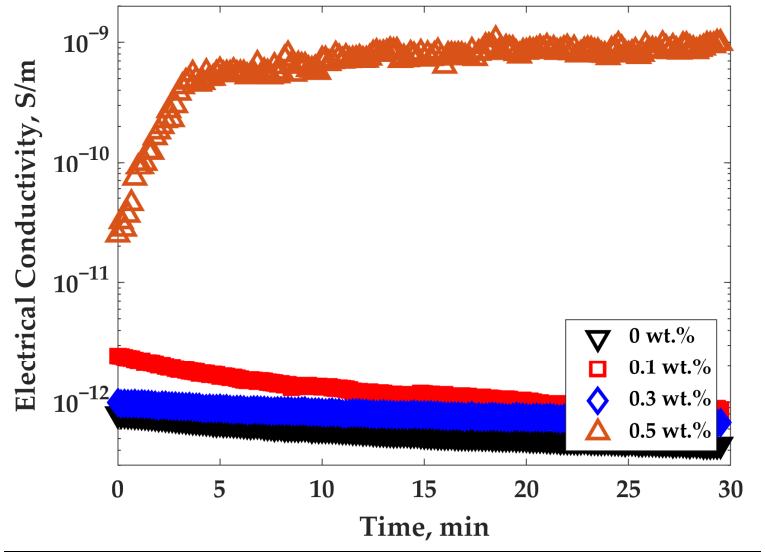


Figure S4. Electrical conductivity as a function of time for PP/MWCNTs composite with 0-0.3 wt.% of MWCNTs measured every 10 s at 1 Hz of frequency and 135 °C.

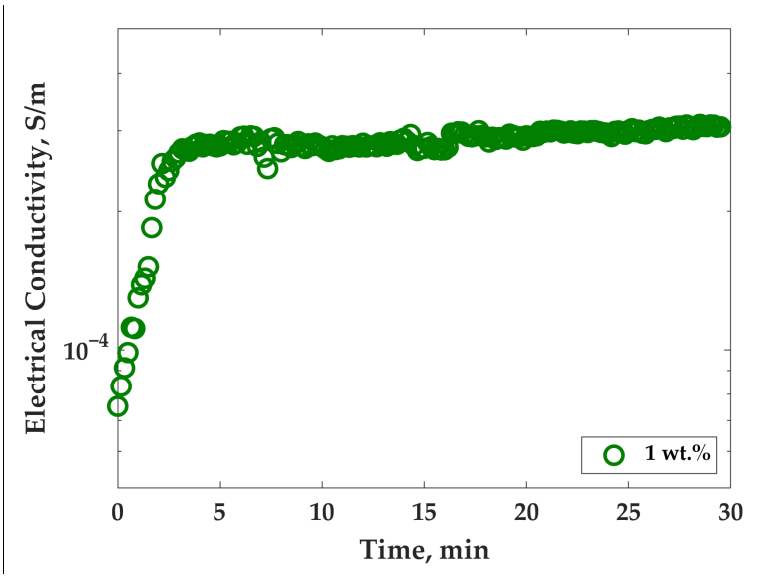


Figure S5. Electrical conductivity as a function of time for PP/MWCNTs composite with 1 wt.% of MWCNTs measured every 10 s at 1 Hz of frequency and 135 °C.