Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Supporting information

A Polymer/Solvent Synergetic Effect to Improve the Solubility of Modified Multi-Walled Carbon Nanotubes.

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After esterification of carbon nanotubes with 1-odcadecylalcohol (ODA), the FTIR spectrum of the product (eMWNTs) show bands corresponding to the modifier (2921 cm^{-1} and 2855 cm^{-1} C-H stretch modes of the alkyl chain; 1731 cm^{-1} C=O stretch of the ester or remaining carboxylic acid; 1450 cm^{-1} C-H bend of the alkyl chain; 1155 cm^{-1} C-O stretch of the ester group), proving the success of the reaction (Figure S1).

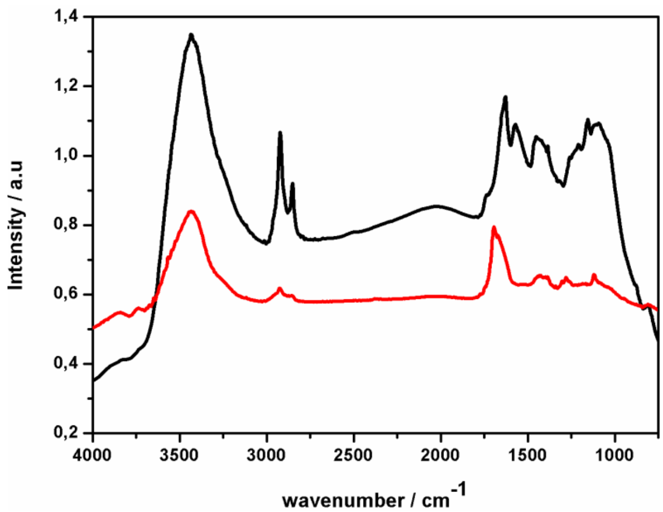

***Figure S1**. FTIR of the ozonized MWNTs before (red line) and after esterification with 1-octadecylalcohol*

Similarly the analysis of the evolving gases during TGA measurements also proves the presence of alkyl chains attached to the nanotube surface. For the first process in the TGA curve (around 300 ºC) the evolution of compounds with different m/z is observed (for clarity we have selected only some representative m/z). The fragments of mass 70, 74, 78, 79, 81, 82, 97, and 100 certainly correspond to species with formula $C_xH_yO_z$, which will undoubtedly come from the fragmentation of the side alkyl chains.

Here it is important to remark two aspects: i) only channels detecting higher molecular weight species were used being reason why no signal of CO_2 and H_2O is observed during decomposition at high temperature and ii) the thermal fragmentation is different to the

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ionization in typical mass spectrometry; thus a countless number of fragments having different mass are detected.

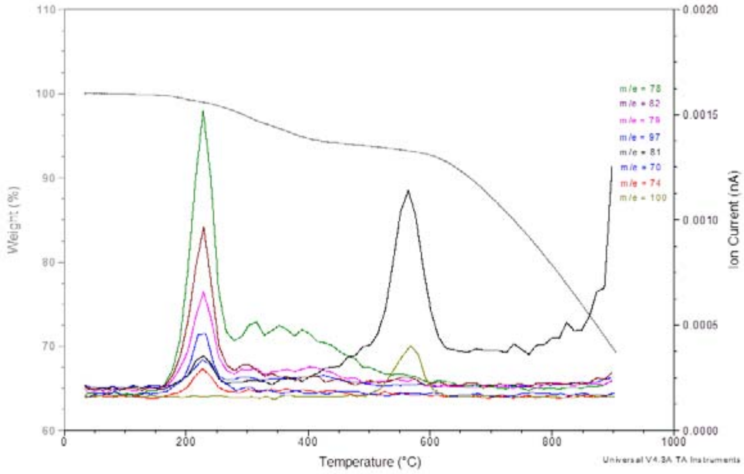

Figure S2. *Thermogravimetric (TG) curves of eMWNTs superimposed with the evolution of gasses detected by mass spectroscopy*

The variation of the storage modulus of PVC/eMWNTs nanocomposites as a function of the temperature is shown in Figure S3. The results suggest that a critical concentration has to be achieved to (around 5 wt. %) to significantly increase the storage modulus.

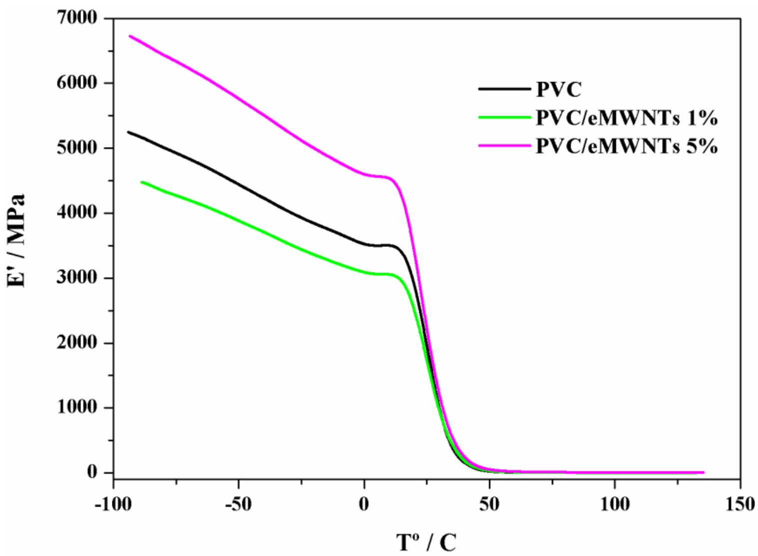

Figure S3. *Variation of storage modulus (E') with the temperature in PVC and its nanocomposites with eMWNTs.*