Supporting Information -

ESR characterisation of platinum nanoparticle functionalised CNT hybrid materials

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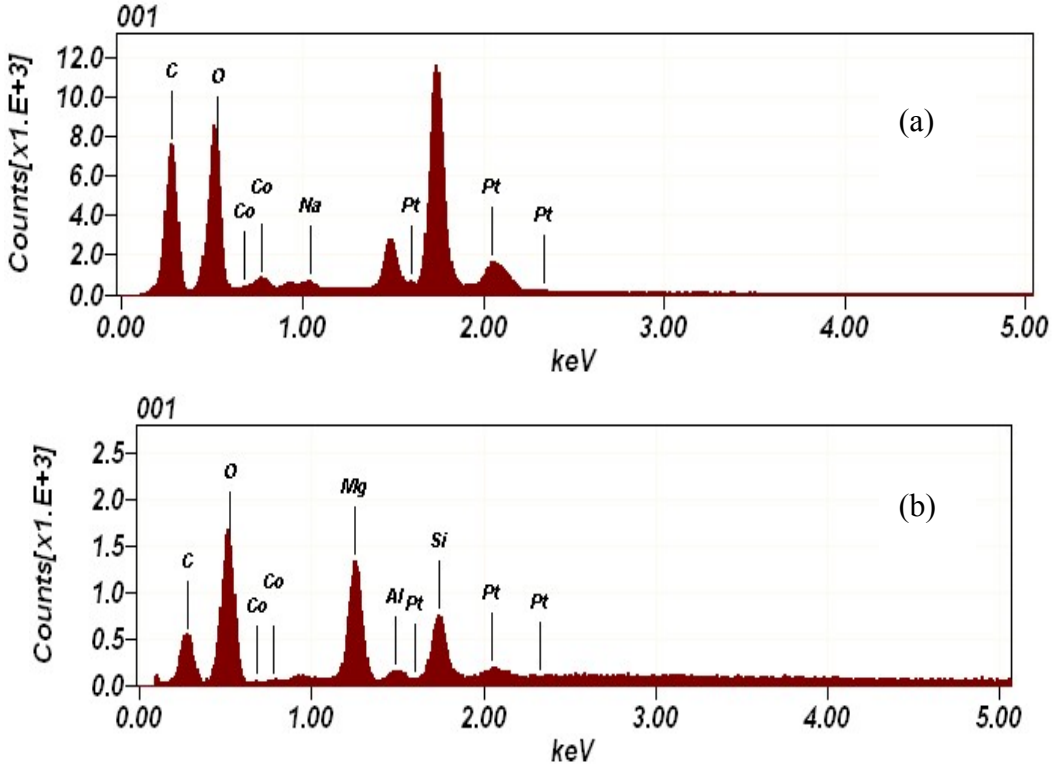
Figure S1: A representative **energy dispersive x-ray** (EDX) spectrum from Pt nanoparticle-decorated CNTs after purification. The Si K_{α} peak is from the Si(100) substrate. (a) represents Pt-SWNTs and (b) shows Pt-MWNTs.



The presence of Co, Mg and Na peaks are attributed to residual catalyst present within the hybrid material. There were no noticeable differences in the C Kα-Au Mα peak intensity ratio. The three peaks representing the Pt content are attributed to the Mα and Mβ peaks (2.06 and 2.35 keV respectively) and the Kα-Au at approximately 1.72 keV. Based on the Pt Mα peak and the C Kα intensity, the Pt nanoparticles represent an upper loading limit of 40% of the SWNT composition and 25% of the MWNT composition.

Table S1 ESR spectral results (from data in Figure 1 and 4).

CNT Sample	ΔH (± 3 G)
As received SWNT	35
MW-SWNT	31
Pt-SWNT	29
As received MWNT	33
MW-MWNT	28
Pt-MWNT	25

All values based on averaged results from spectra of 5 analogous samples.

Table S2

RBM modes and subsequent diameters calculated from Raman spectra shown in Figure 1 insert.

CNT Sample	RBM[1] (± 4 cm^{-1})	Diameter[2] (±0.06 nm)
As-received SWNT	194	1.07
	218	0.96
	256	0.83
	282	0.75
MW-SWNT	195	1.07
	220	0.95
	260	0.81
	285	0.75
Pt-SWNT	196	1.06
	220	0.95
	256	0.85
	284	0.75

[1] RBM refers to radial breathing modes of SWNTs.[2] Diameter calculated from equation described in text. All values based on averaged results from spectra of 5 analogous samples.

Figure S3: Typical ESR spectra for SWNTs (black line) and MWNT, (red line) after microwave radiation without ethylene glycol. A microwave frequency of 9.87 GHz, attenuator of 10.0 dB, sweep width of 70 G, modulation frequency of 100 kHz, modulation amplitude of 1 G, time constant of 20.48 msec, conversion time of 81.92 msec and sweep time of 83.92 s were employed.