Synthesis of monodispersed Pt nanoparticles on plasma processed carbon nanotubes for Methanol Electro-oxidation Reaction

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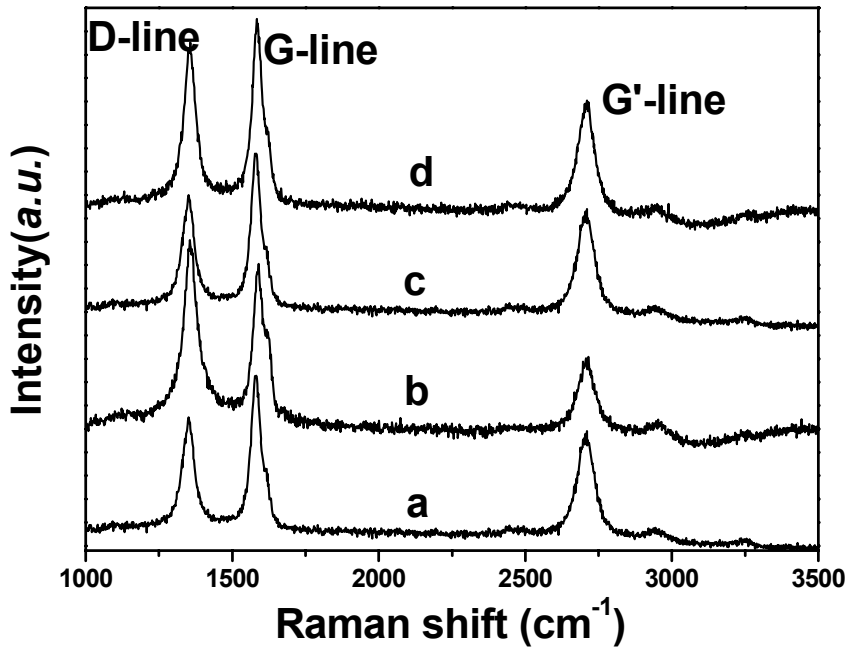

Fig. S1 Raman spectra of (a)Raw MWCNTs, (b)CM-MWCNTs, (c)PS-MWCNTs, and (d)PG-MWCNTs.

The peak at 1350 cm^{-1} is assigned to the A_{1g} breathing mode of disordered graphite structure (D-line), and the high frequency peak at 1580 cm^{-1} (G-line) corresponds to a splitting of the E_{2g} stretching mode of graphite, which reflects the structural intensity of the sp^2-hybridized carbon atoms. The peak near 2650 cm^{-1} (G'-line) is assigned to the first overtone of the D mode.[1] The height of the D peak usually increases upon surface modification of carbon nanomaterials.[2] Thus, the extent of the modification or defect in

MWCNTs can be evaluated by the intensity ratio of the D- and G-lines. From the Fig. S1, we can extract the intensity ratio of I_D/I_G is 0.70, 1.15, 0.72 and 0.82 for Raw-MWCNTs, CM-MWCNTs, PS-MWCNTs and PG-MWCNTs, respectively. It is clear that the CM-MWCNTs have a higher I_D/I_G ratio (or more structural damage), which indicates the acid-oxidation treatment would cause a significant structural damage on MWCNTs and thus decrease the electrical conductivity of MWCNTs. These PS-MWCNTs and PG-MWCNTs have I_D/I_G ratio close to Raw-MWCNTs. It indicates these two functionalization methods do not cause significant structure changes of MWCNTs and wouldn't give rise to the loss in the conductivities of MWCNTs.

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