

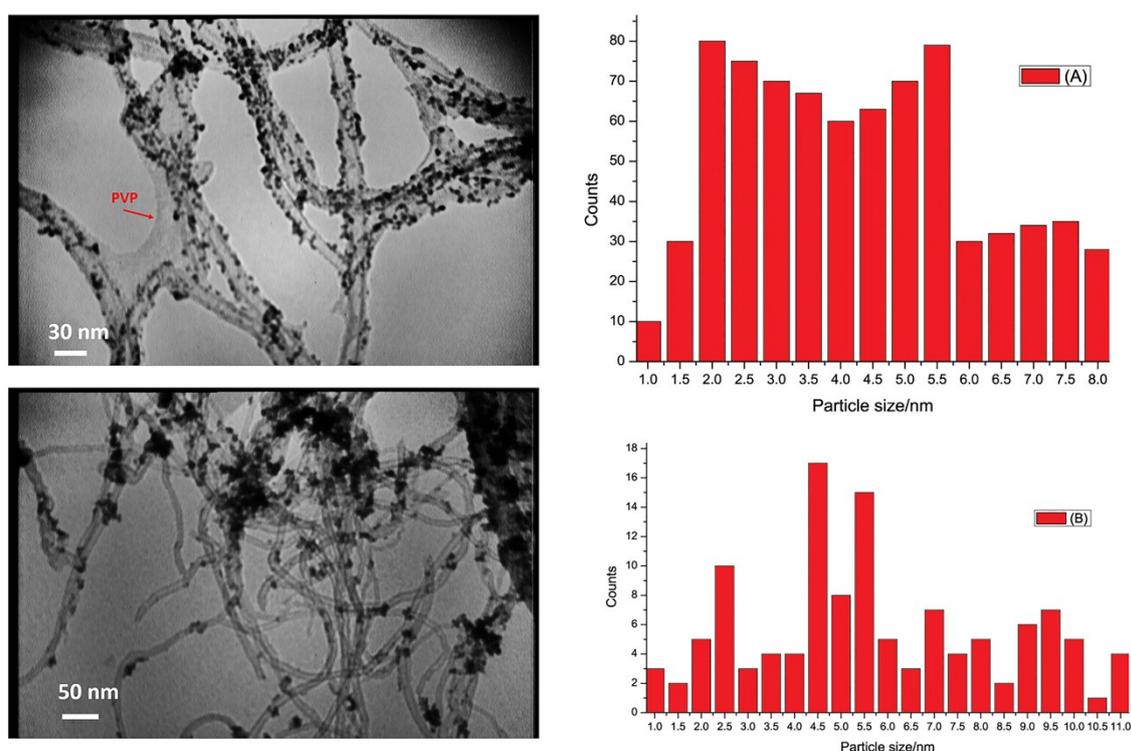
## Supporting Information

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Received 00th January 2016,  
Accepted 00th January 20xx

DOI: 10.1039/x0xx00000x

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**Fig. S1.** (A) MWNT/PVP/Pt and, (B) MWNT/Pt. Mean-diameter of the Pt on MWNT/PVP/Pt and MWNT/Pt are determined to 4.2 nm and 4.5 nm, respectively.

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†Short title: Platinum Nanoparticles with Superacid-Doped Polyvinylpyrrolidone Coated Carbon Nanotube. Electronic Supplementary Information (ESI) available: Fig. S1–S2, Table 1(s) and Fig.S3. See DOI: 10.1039/x0xx00000x

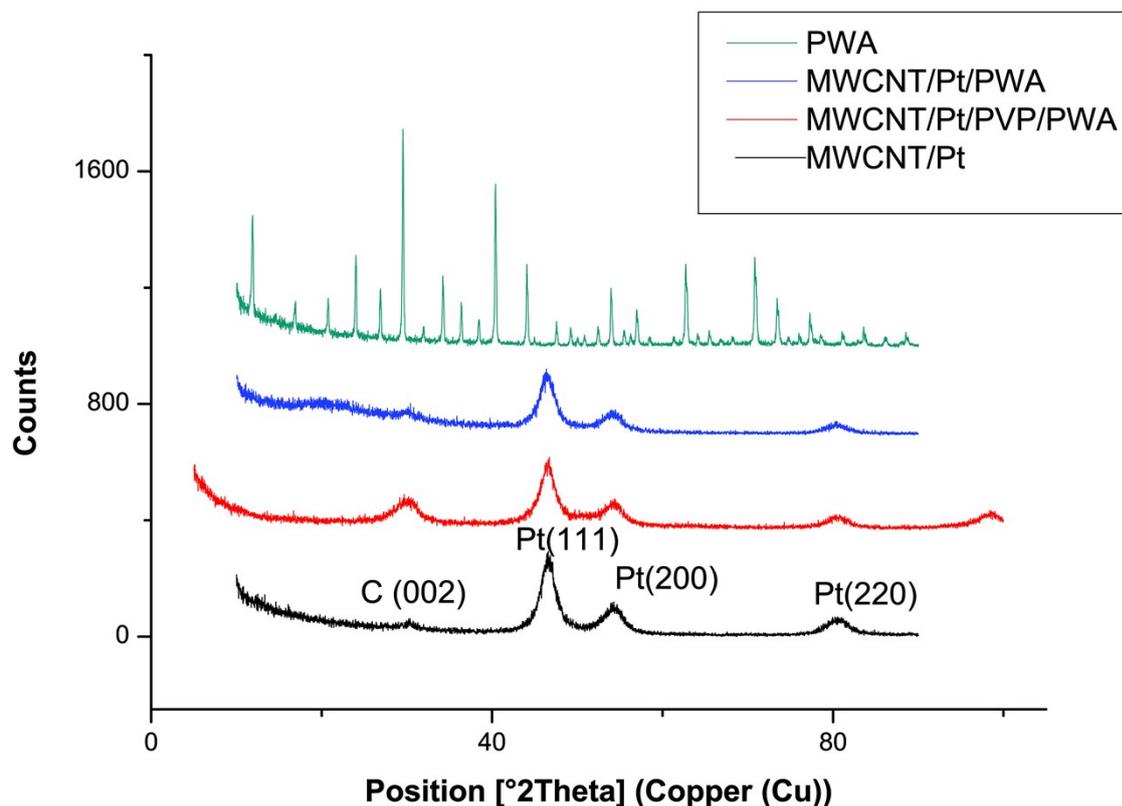


Fig.S2. X-ray diffraction pattern of PWA, MWCNT/Pt/PWA, MWCNT/Pt/PVP/PWA and MWCNT/Pt

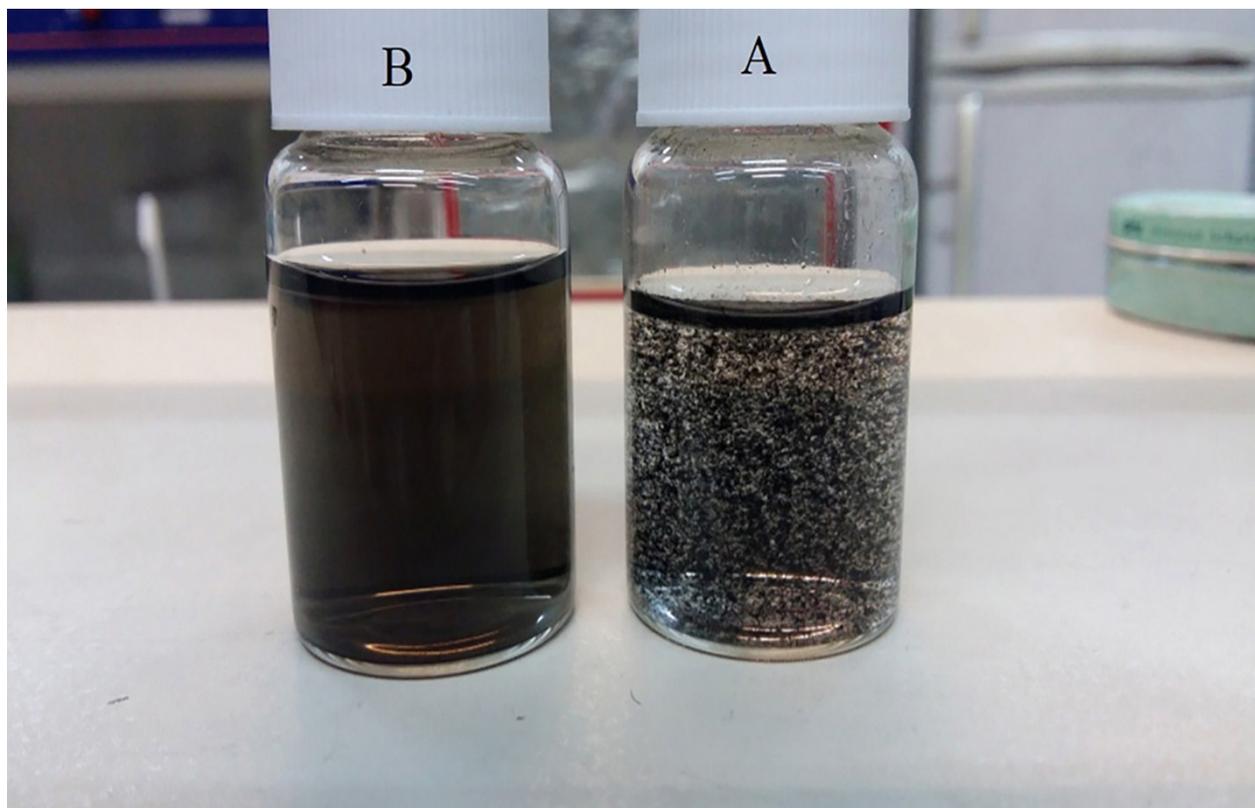
The structures of MWCNT/ Pt Nano composite were studied by using X-ray diffraction (XRD) and shown in Fig.S2. Reflection planes (111), (200), (220) corresponding to a cubic structure of Platinum. The very weak and broad diffraction peak observed at  $2\theta = 31^\circ$  in the nanocomposite could be attributed to the (0 0 2) reflection plane of the MWCNTs because the agglomeration of Pt nanoparticles on the CNTs surfaces and subsequently oscillation amplitude of MWCNTs were decreased. The crystallite size of Pt nanoparticles on MWCNT/Pt, MWCNT/PVP/Pt and MWCNT/PVP/PWA/Pt were estimated to be 4.6nm, 4.6nm and 5.1nm respectively were measured by the Debye Scherrer formula. The X-ray diffraction analysis confirmed that in presence of PVP, the Pt nanoparticles uniformly dispersed on the MWCNTs surface, which MWCNT peak more intense respect to other, corresponding with the result of transmission electron microscopy. By adding PWA, nanoparticles crystallite size

increased due to acting of PWA/PVP as a cross linker between MWCNTs, agglomeration of Pt nanoparticles were also observed on the MWCNT surfaces and the oscillation amplitude corresponds to the (002) plane of MWCNTs were decreased.

**Table 1 (s):** average Size of Pt nanoparticles (nm) from XRD

(a is the lattice constant)

Catalysts	$a_{Pt}$	Pt(111)	Pt(200)	Pt(220)	average Size of Pt nanoparticles (nm)
MWCNT/Pt	3.920	5.6	4.4	4.0	4.6
MWCNT/PVP/Pt	3.923	5.1	5.1	3.5	4.6
MWCNT/Pt/PVP/PWA	3.928	5.8	4.9	4.6	5.1



**Fig.S3.** MWCNTs before polymerization (A) and after polymerization (B) in pure water