Supporting Information

Redox Charging of Nanoparticle Thin Films in Ionic Liquids

*Wanzhen Li and Bin Su**

Institute of Microanalytical Systems, Department of Chemistry, Zhejiang University, 310058 Hangzhou, China

*Correspondence author:
Dr. Bin SU
Tel: +86 571 88273496; Fax: +86 571 88273572

Email: subin@zju.edu.cn

1. Synthesis and characterization of MPCs

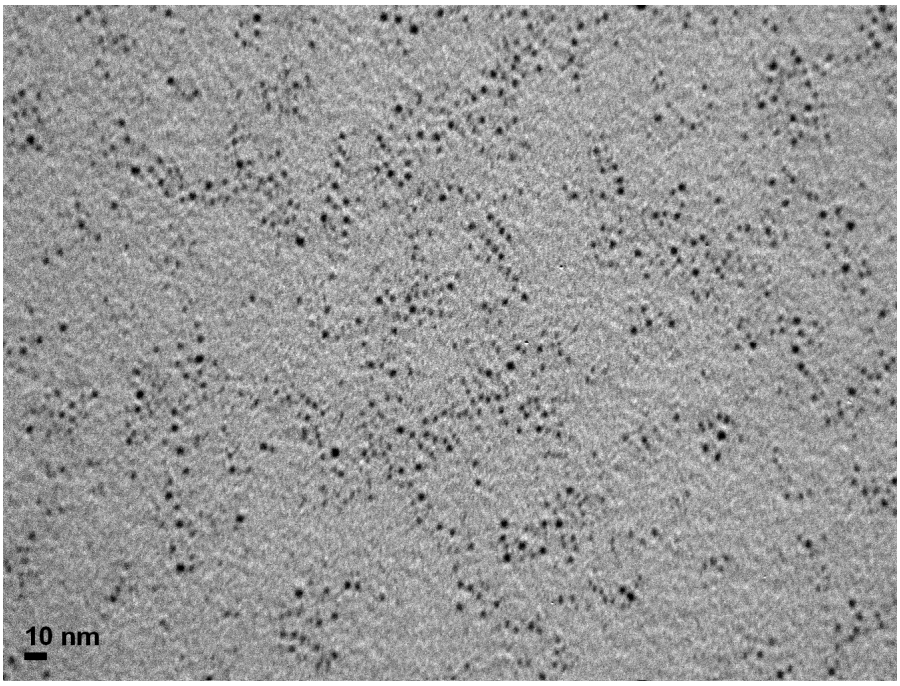

Figure S-1. Transmission electron microscopy image of MPCs which shows that a highly monodisperse sample was obtained. The image was obtained on a JEM-1230 transmission electron microsopy (JEOL, Japan) at

an operating voltage of 120 kV.

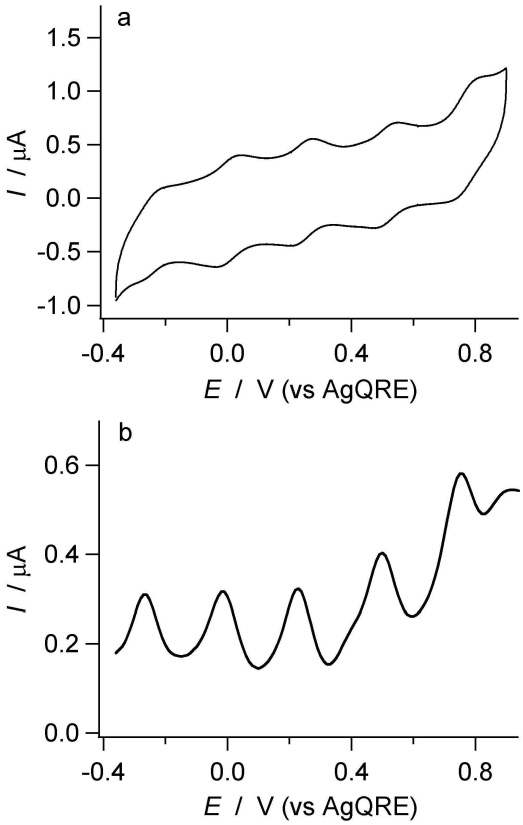

Figure S-2. (a) Cyclic voltammetry of 50 μM MPCs in 0.10 M $TBAClO_4$/DCE at a scan rate of 0.04 V s^{-1}. (b) Corresponding differential pulse voltammetry.

2. More CVs of MPC films in $BMIm^+$ ILs

More CVs in $BMIm^+$ ILs except $BMIm^+BF_4^-$ are displayed in this section: $BMIm^+SbF_6^-$ (**Figure S-3**), $BMIm^+ClO_4^-$ (**Figure S-4**), $BMIm^+Tf_2N^-$ (**Figure S-5**) and $BMIm^+PF_6^-$ (**Figure S-6**).

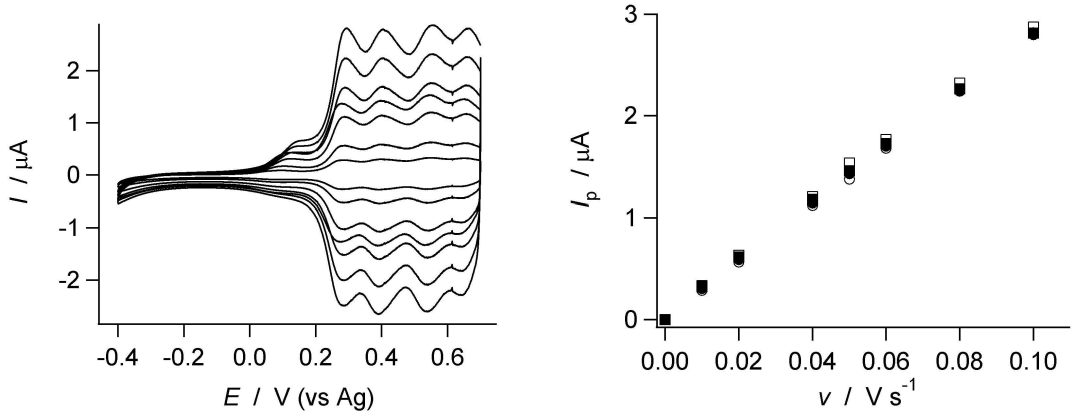

Figure S-3. (left) Cyclic voltammetry of MPC films in $BMIm^+SbF_6^-$ at various scan rates: 0.01, 0.02, 0.04, 0.05, 0.06, 0.08 and 0.10 V s^{-1}. (right) Scan rate dependence of anodic peak currents.

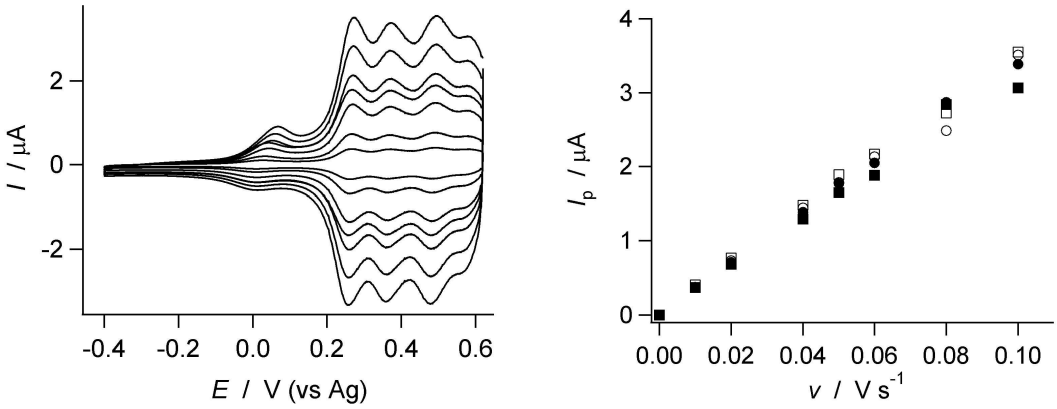

Figure S-4. (left) Cyclic voltammetry of MPC films in $BMIm^+ClO_4^-$ at various scan rates: 0.01, 0.02, 0.04, 0.05, 0.06, 0.08 and 0.10 V s^{-1}. (right) Scan rate dependence of anodic peak currents.

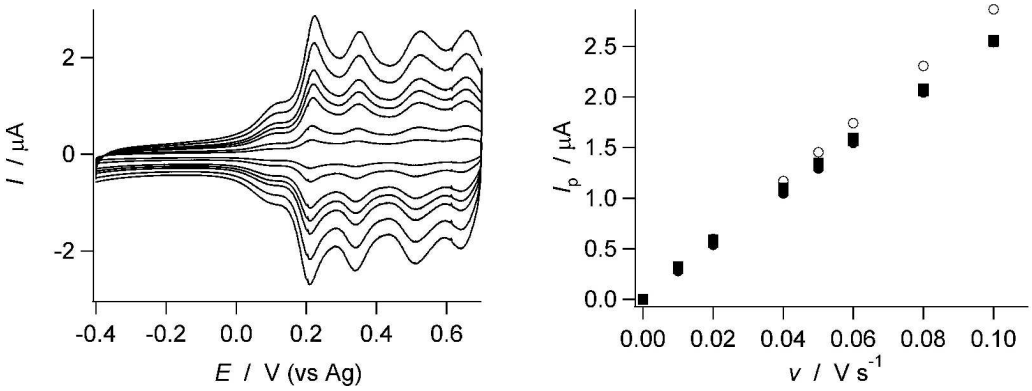

Figure S-5. (left) Cyclic voltammetry of MPC films in $BMIm^+Tf_2N^-$ at various scan rates: 0.01, 0.02, 0.04, 0.05, 0.06, 0.08 and 0.10 V s^{-1}. (right) Scan rate dependence of anodic peak currents.

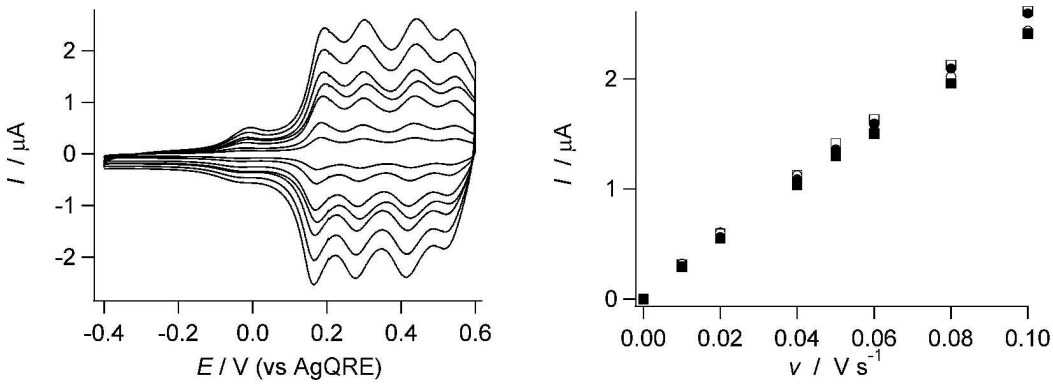

Figure S-6. (left) Cyclic voltammetry of MPC films in $BMIm^+PF_6^-$ at various scan rates: 0.01, 0.02, 0.04, 0.05, 0.06, 0.08 and 0.10 V s^{-1}. (right) Scan rate dependence of

anodic peak currents.

3. Voltammetry of MPC films in aqueous media

Figure S-7 compares the cyclic voltammetry of MPC films in various alkaline salt solutions at the same of concentration of 0.10 M, which shows that the onset oxidative potential follows an order of Tf_2N^- < PF_6^- < ClO_4^- < BF_4^-.

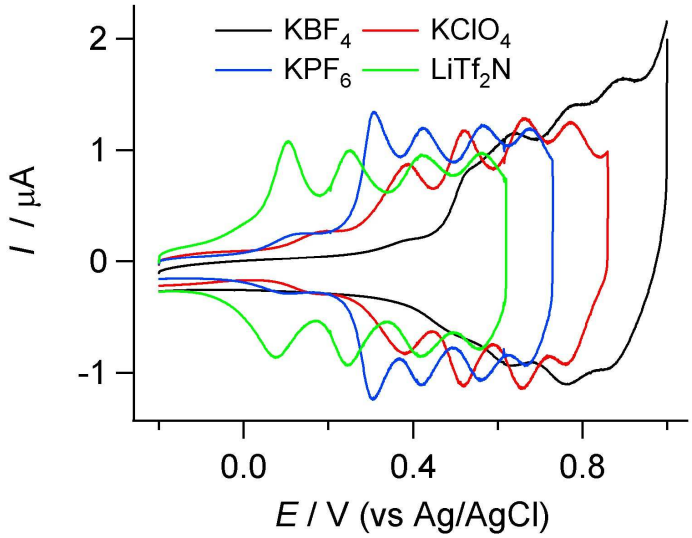

Figure S-7. Cyclic voltammetry of MPC films in aqueous media containing various salts at a scan rate of 0.04 V s^{-1}.

4. Variation of charging potentials in BMIm+ ILs with anion type

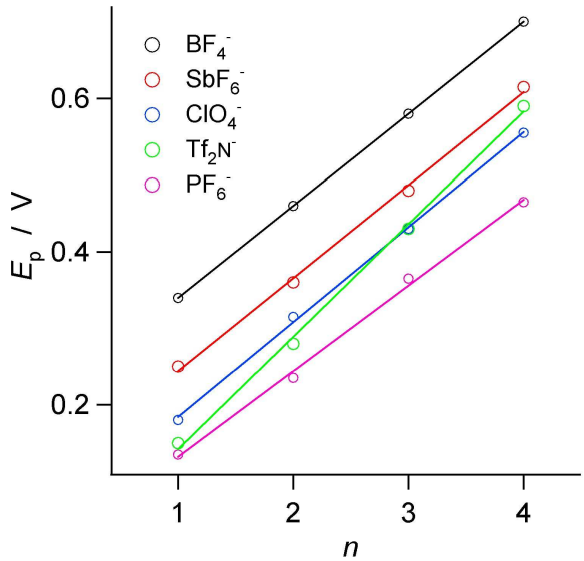

Figure S-8. The first four charging peak potentials in BMIm+ group ILs. The slope of straight lines reflects the average spacing of charging potentials. Clearly a largest slope is observed with Tf_2N^-.