

**Supporting Information**

**For**

**Permselectivity and Thickness-Dependent Ion Transport Properties of Overoxidized  
Polyaniline: A Mechanistic Investigation**

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## FTIR studies

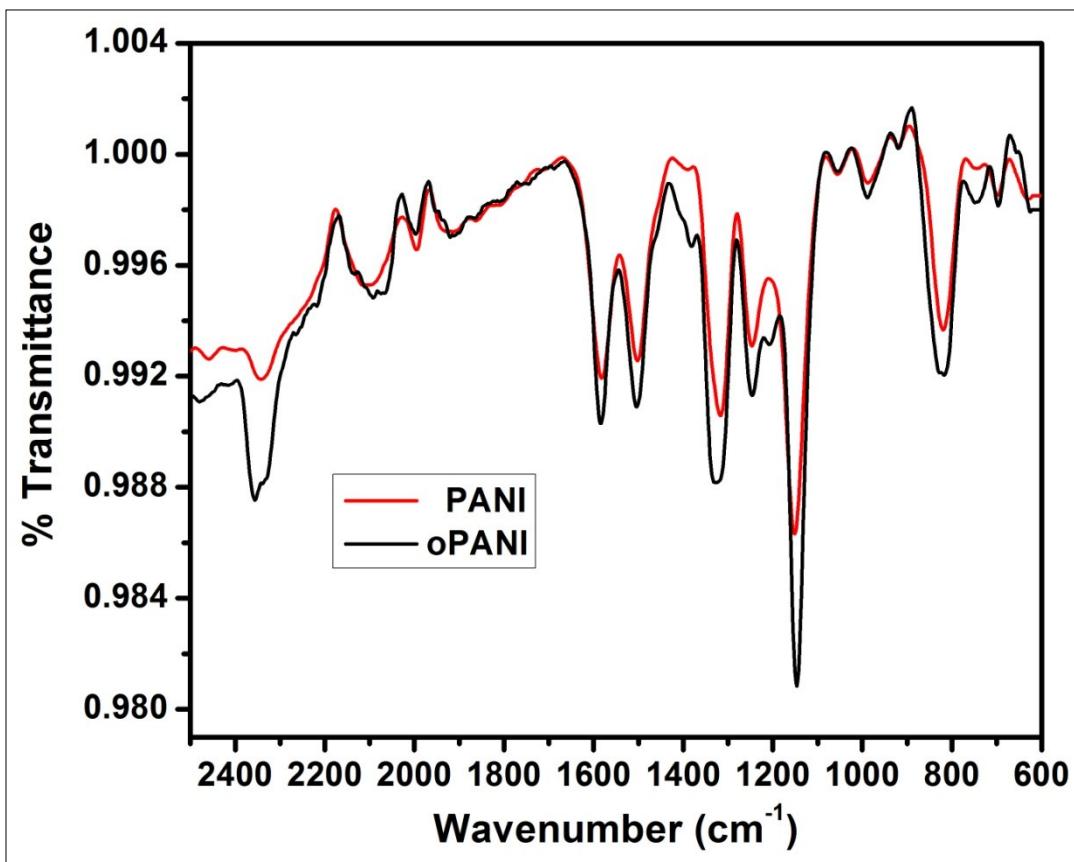
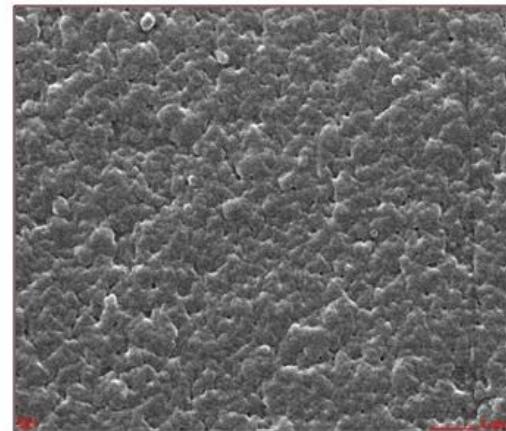
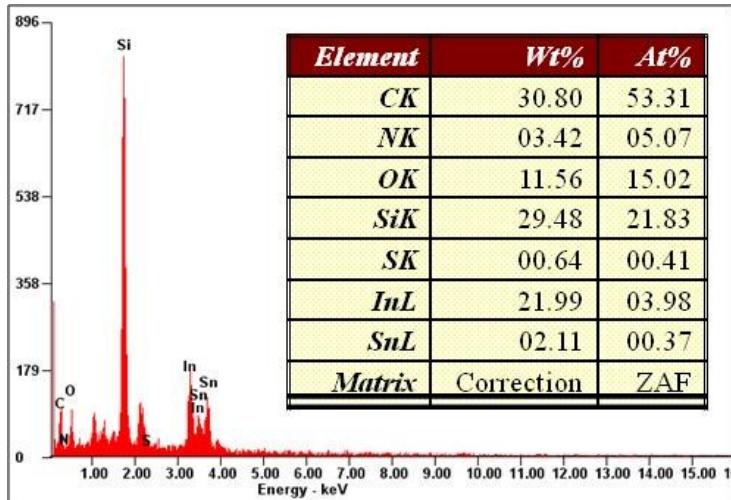


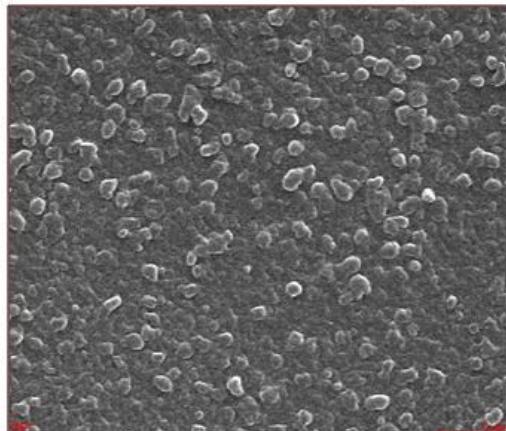
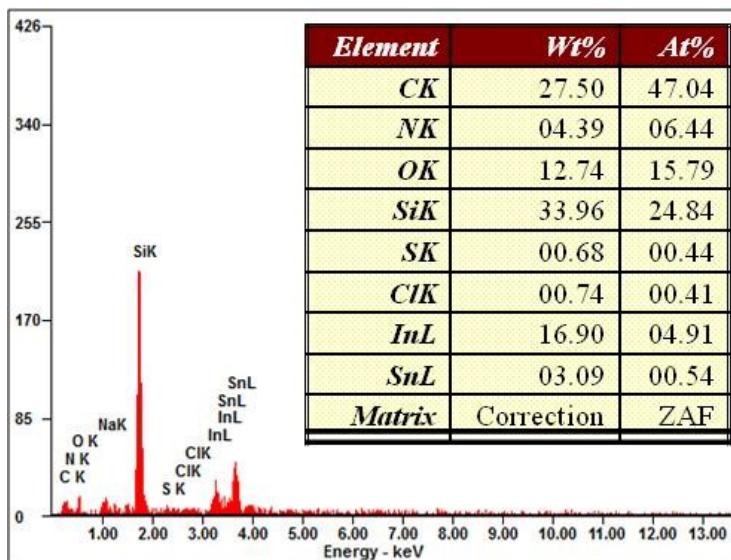
Fig. S1 FTIR spectra of PANI and oPANI on ITO electrode surface.

## EDAX studies

PANI

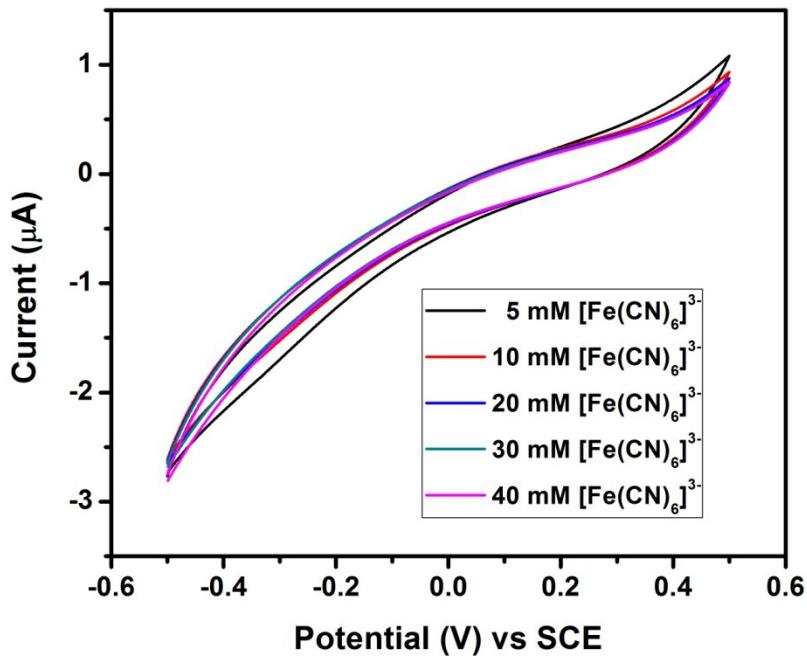


oPANI

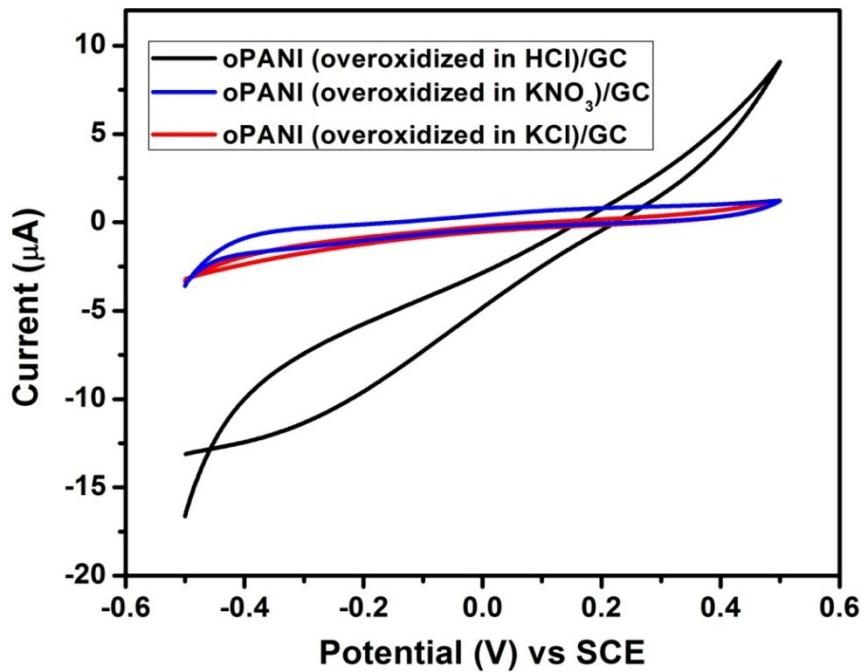


**Fig. S2** EDAX spectra of PANI and oPANI on ITO electrode.

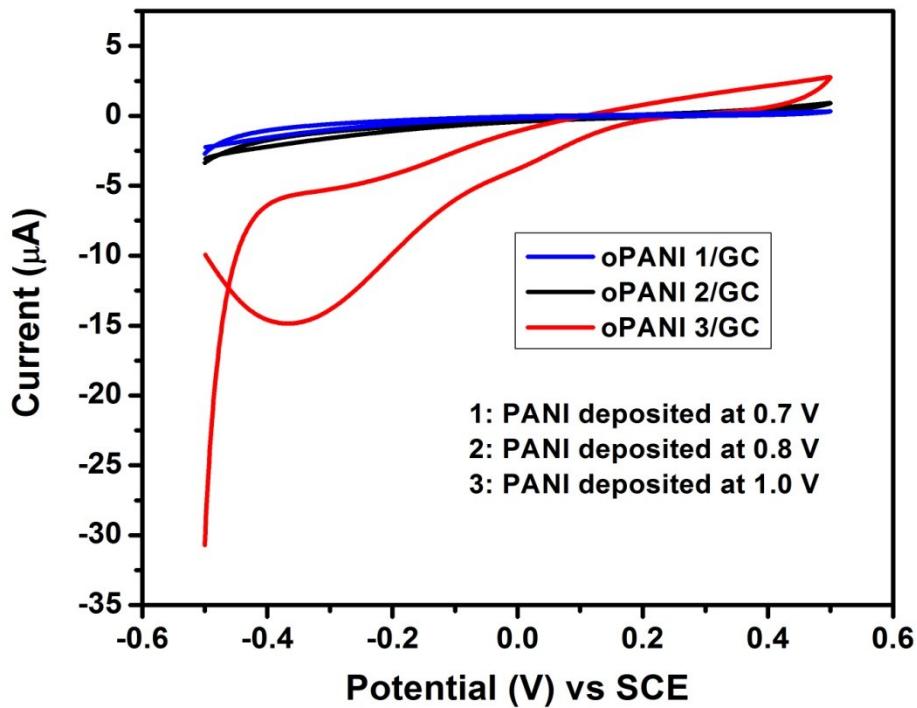
### Cyclic Voltammetric studies



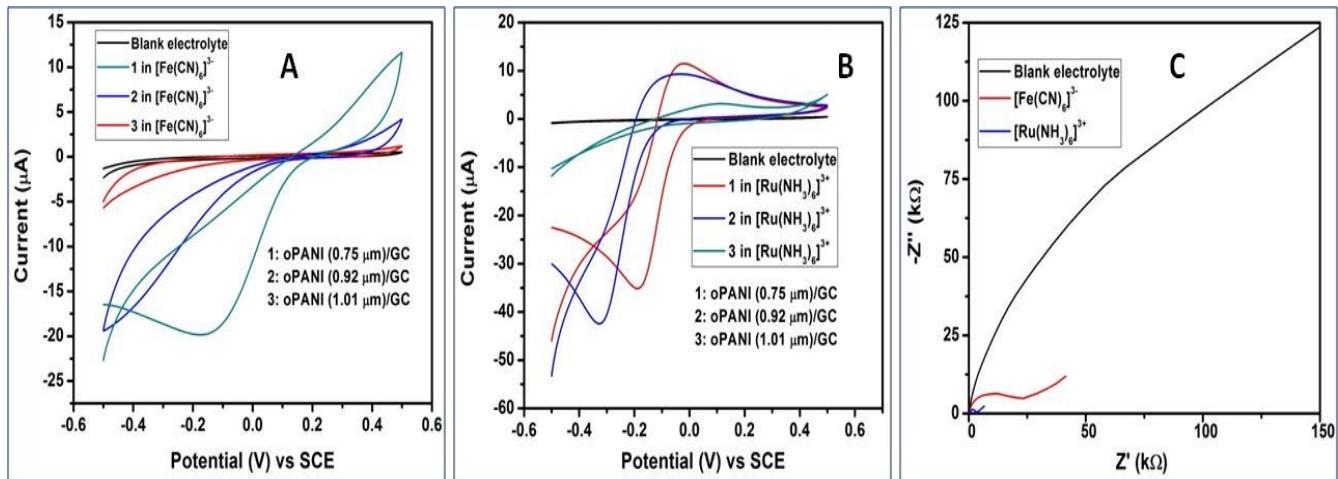
**Fig. S3** Cyclic Voltammetric response of the oPANI/GC electrode at different concentrations of  $[\text{Fe}(\text{CN})_6]^{3-}$ .



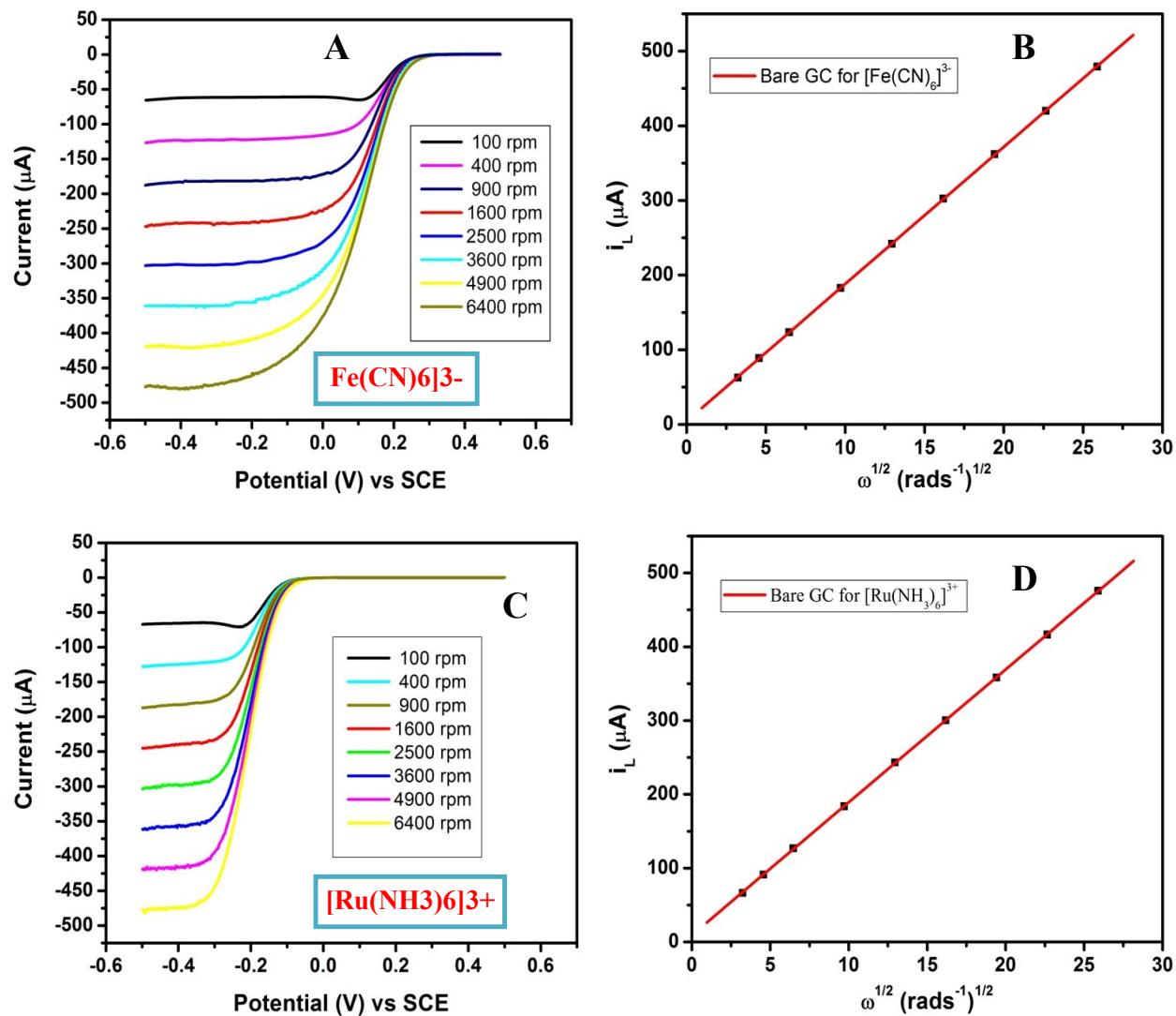
**Fig. S4** Cyclic voltammograms of oPANI/GC electrode towards  $[\text{Fe}(\text{CN})_6]^{3-}$  when the overoxidation was performed in different electrolytes.



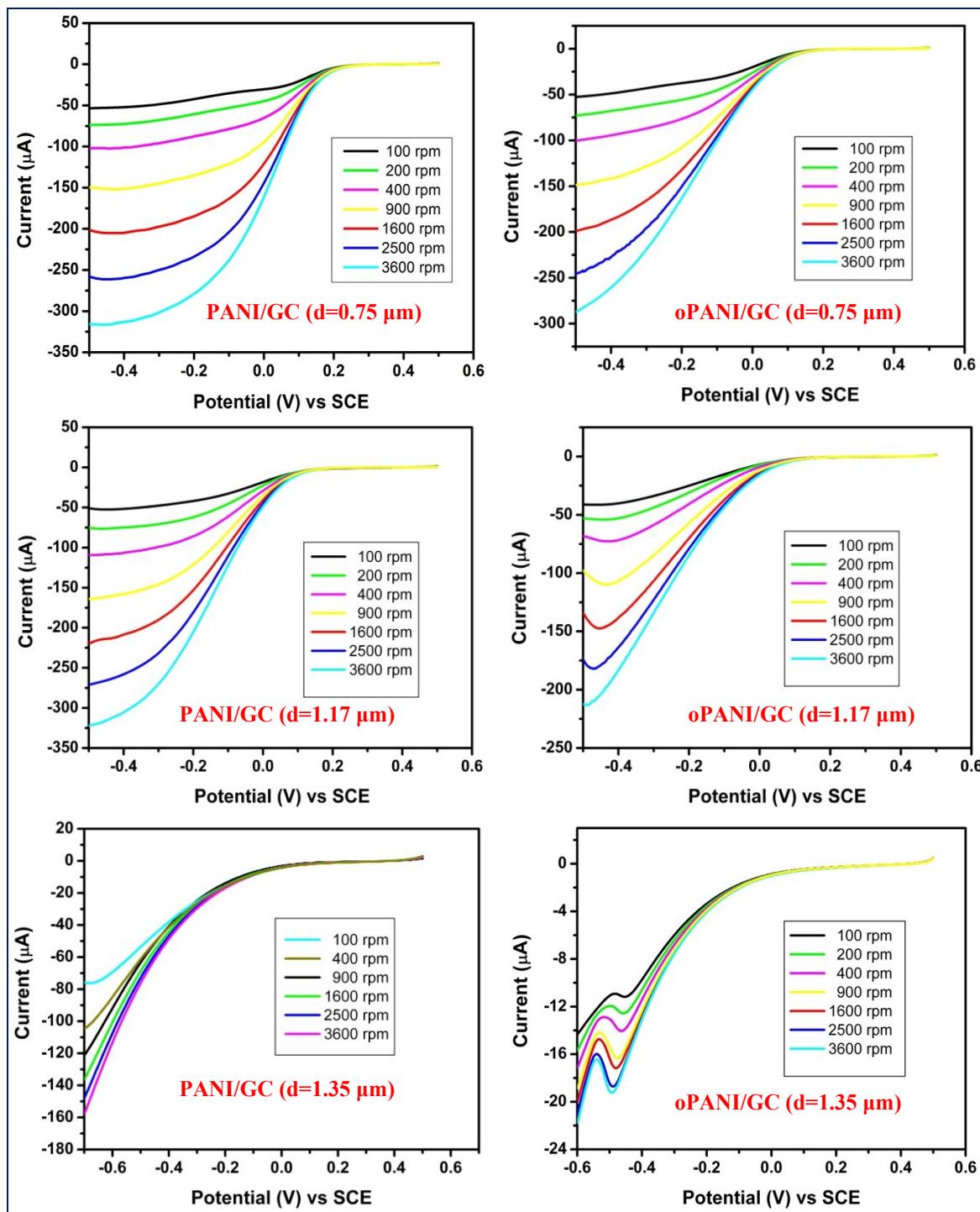
**Fig. S5** Cyclic voltammograms of oPANI/GC electrode towards  $[\text{Fe}(\text{CN})_6]^{3-}$  when the deposition of PANI was carried out at different potentials.



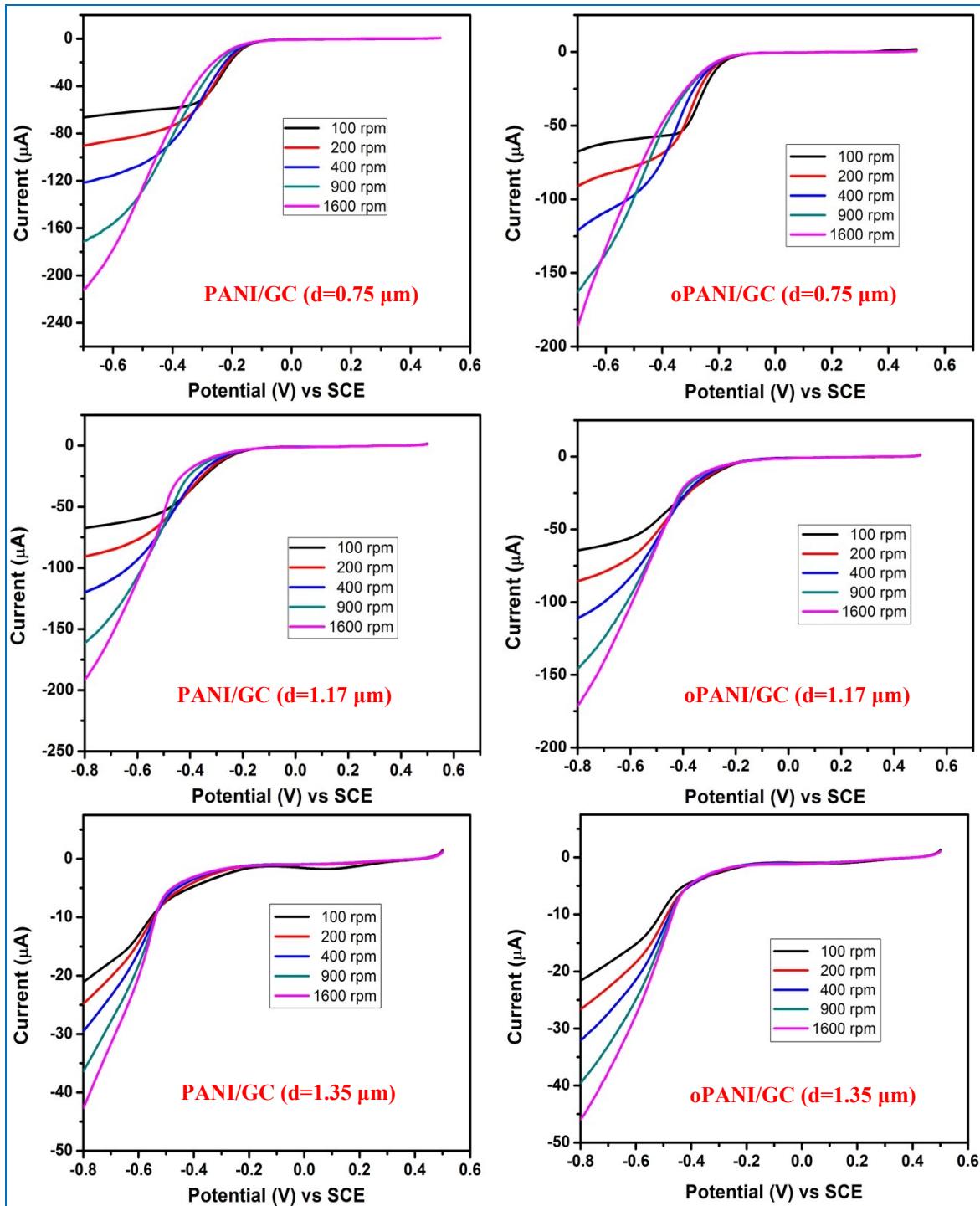
**Fig. S6** Comparison of the cyclic voltammetric response of oPANI/GC electrode in blank solution (0.1 M KCl) and in presence of redox probe (A and B). (C) Nyquist plots of oPANI/GC in blank solution (0.1 M KCl) and in presence of redox probe.



**Fig. S7** Linear Sweep Voltammograms of the bare GC electrode in 0.1 M KCl solution for (A)  $[\text{Fe}(\text{CN})_6]^{3-}$  and (C)  $[\text{Ru}(\text{NH}_3)_6]^{3+}$  at different rotational speeds. (B) and (D) represent the corresponding Koutecky- Levich plots.



**Fig. S8** RDE linear sweep voltammograms of  $[\text{Fe}(\text{CN})_6]^{3-}$  at PANI/GC and oPANI/GC for various film thickness at different rotation speeds.



**Fig. S9** RDE linear sweep voltammograms of  $[\text{Ru}(\text{NH}_3)_6]^{3+}$  at PANI/GC and oPANI/GC for various film thickness at different rotation speeds.