

## **Electronic Supporting Information (ESI)**

### **Quaternary Phosphonium-based (TPQPCl)-Ionomer/Graphite Nanoplatelets Composite Chemically Modified Electrodes: a Novel Platform for Sensing Applications**

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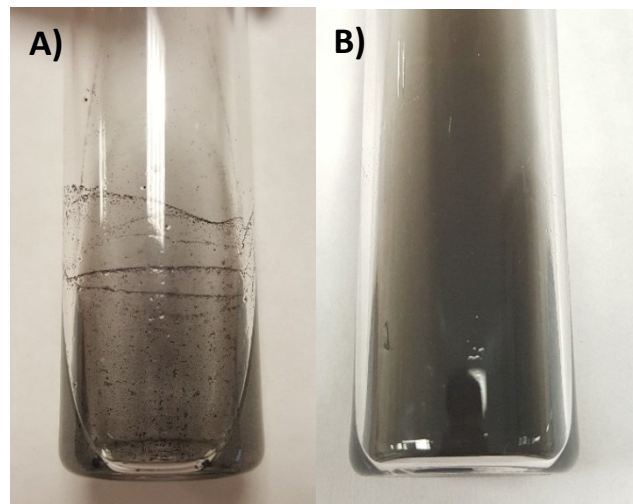
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## The dispersion of GNPs in the presence of TPQPCI

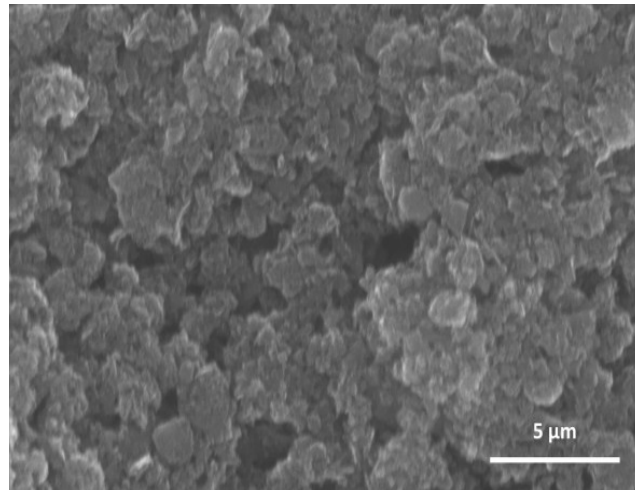
The presence of TPQPCI in the composite is beneficial to the dispersion of GNPs flakes and prevents aggregation. TPQPCI/GNPs nanocomposite shows good dispersion in water up to more than 2 months after the preparation. Figure S1a shows aggregation of pristine GNPs in water, whereas the TPQPCI//GNPs composite is well dispersed in the same solvent.



**Figure S1.** a) GNPs b) TPQPCI/GNPs dispersion in water after the sonication process.

## Scanning electron microscopy (SEM)

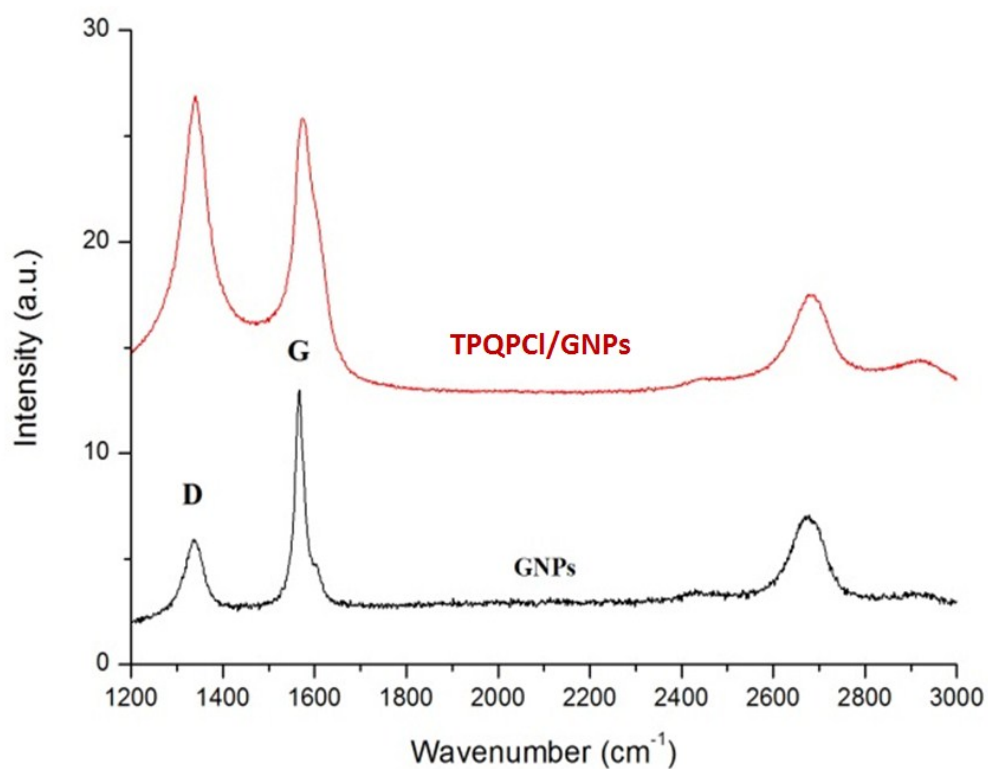
SEM image of 2  $\mu\text{L}$  TPQPCI/GNPs drop cast onto Si/SiO<sub>2</sub> slides shows the formation of a homogeneous layer.



**Figure S2.** SEM picture of TPQPCI/GNPs 0.025% in Si/SiO<sub>2</sub>

## Raman Spectroscopy

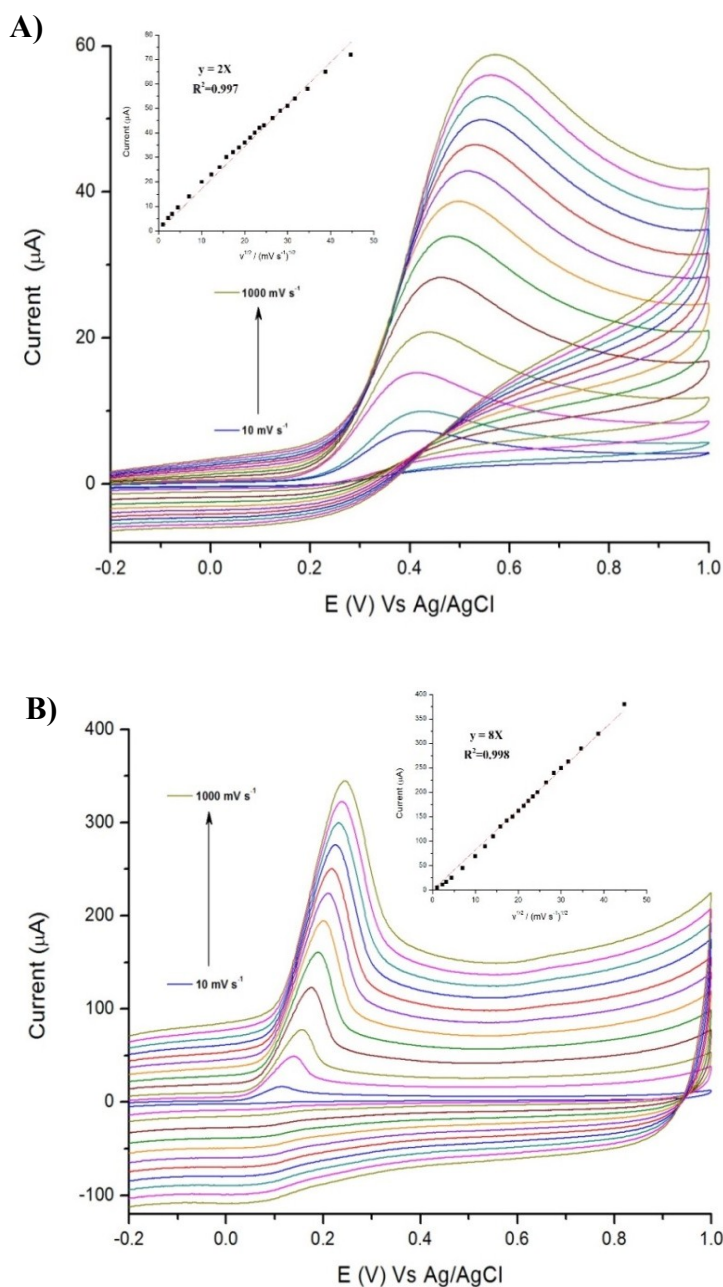
Raman spectroscopy depicts the presence of GNPs and also provides information about the defect in the graphene flakes due to the defects induced during the nanocomposite synthesis.



**Figure S3.** Raman spectrum of TPQPCI/GNPs 0.025% nanocomposite (red line) and GNPs alone (black line)

## Dependence of voltammetric peak with the scan rate

Figure S4 shows the dependence of the voltammetric peak of (A) TPQPCl and (B) TPQPCl/GNPs with the scan rate in the presence of 1 mM ascorbic acid in 0.1 M NaCl supporting electrolyte (pH 4). The peak current increases linearly with the increase of the square root of scan rate.



**Figure S4.** CVs of A) TPQPCl 0.025%, and B) TPQPCl/GNPs 0.025% recorded in 1 mM AA and 0.1 M NaCl supporting electrolyte (pH 4).; scan rates from 10  $\text{mV s}^{-1}$  to 1  $\text{V s}^{-1}$ . Inset: plot of peak current with the square root of scan rate.