

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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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.

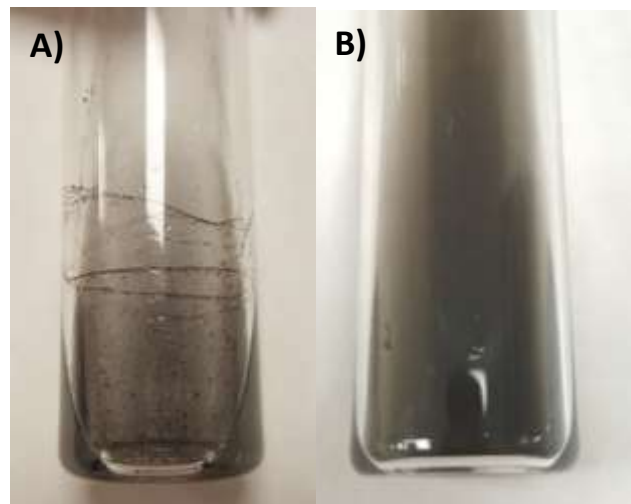


Figure S1. a) GNPs b) TPQPCI/GNPs dispersion in water after the sonication process.

Scanning electron microscopy (SEM)

SEM image of 2 μL TPQPCl/GNPs drop cast onto Si/SiO₂ slides shows the formation of a homogeneous layer.

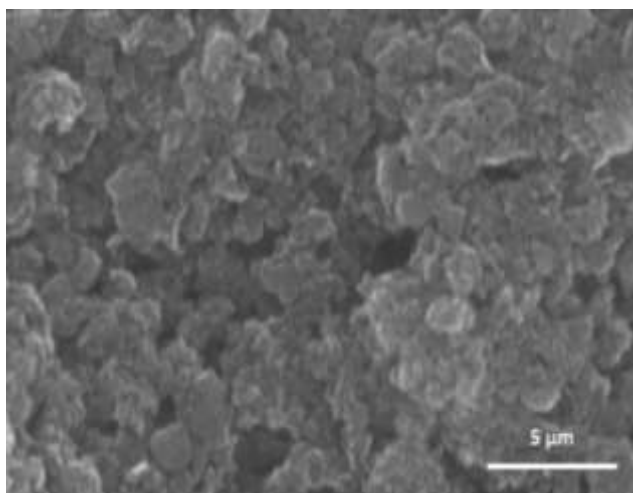


Figure S2. SEM picture of TPQPCl/GNPs 0.025% in Si/SiO₂

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.

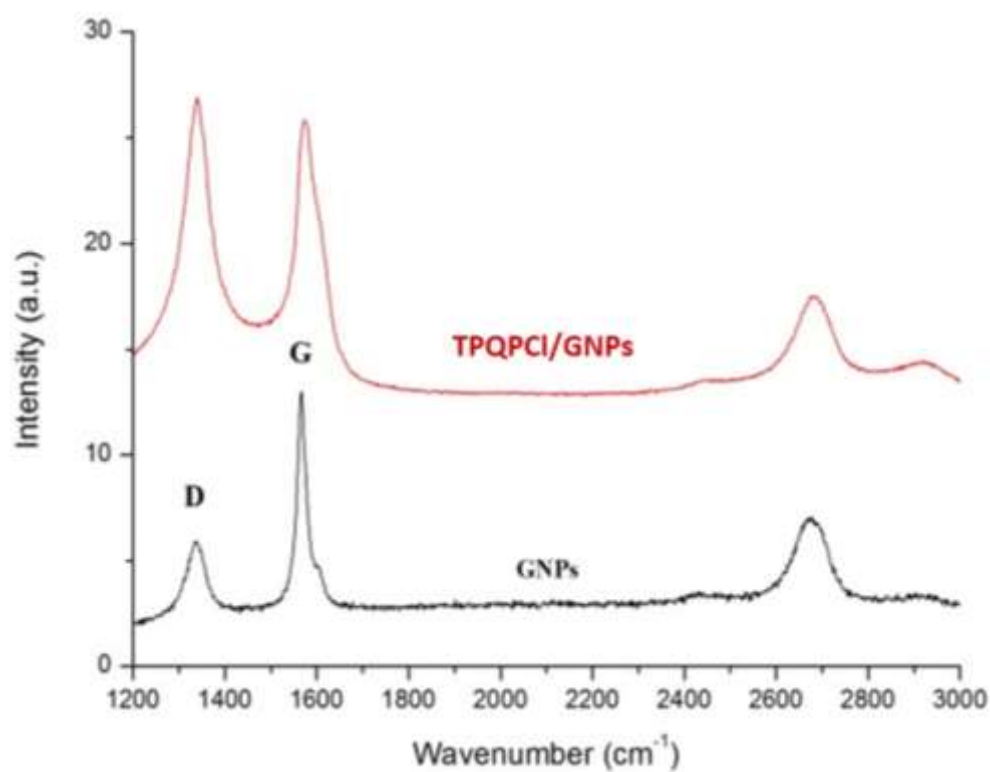


Figure S3. Raman spectrum of TPQPCI/GNPs 0.025% nanocomposite (red line) and GNPs alone (black line)

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.

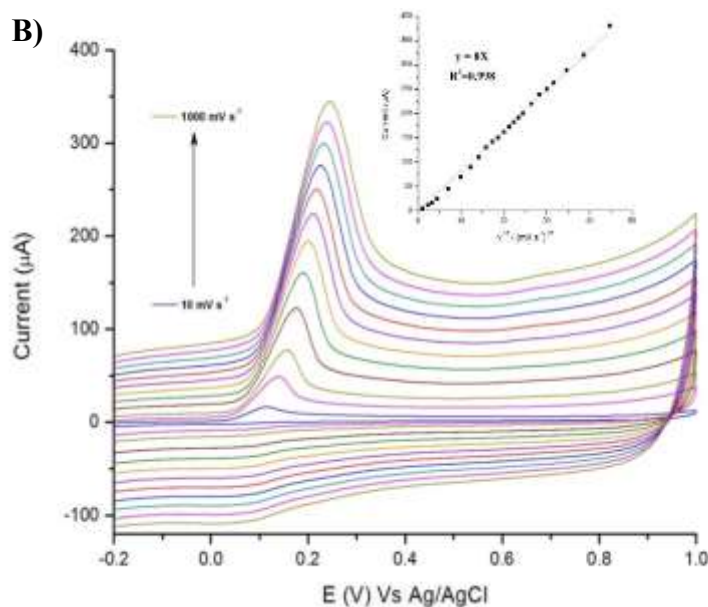
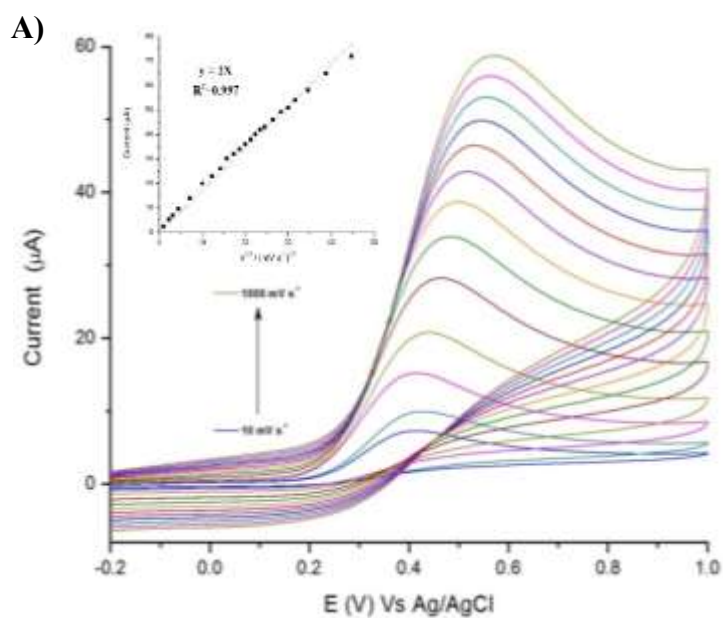


Figure S4. CVs of A) TPQPCI 0.025%, and B) TPQPCI/GNPs 0.025% recorded in 1 mM AA and 0.1 M NaCl supporting electrolyte (pH 4).; scan rates from 10 mV s⁻¹ to 1 V s⁻¹. Inset: plot of peak current with the square root of scan rate.