Electronic Supplementary Material (ESI) for Analyst.

Supporting Information

Picomolar level Electrochemical Detection of Hydroquinone, Catechol and Resorcinol Simultaneously Using a MoS_2 Nano-Flower Decorated Graphene

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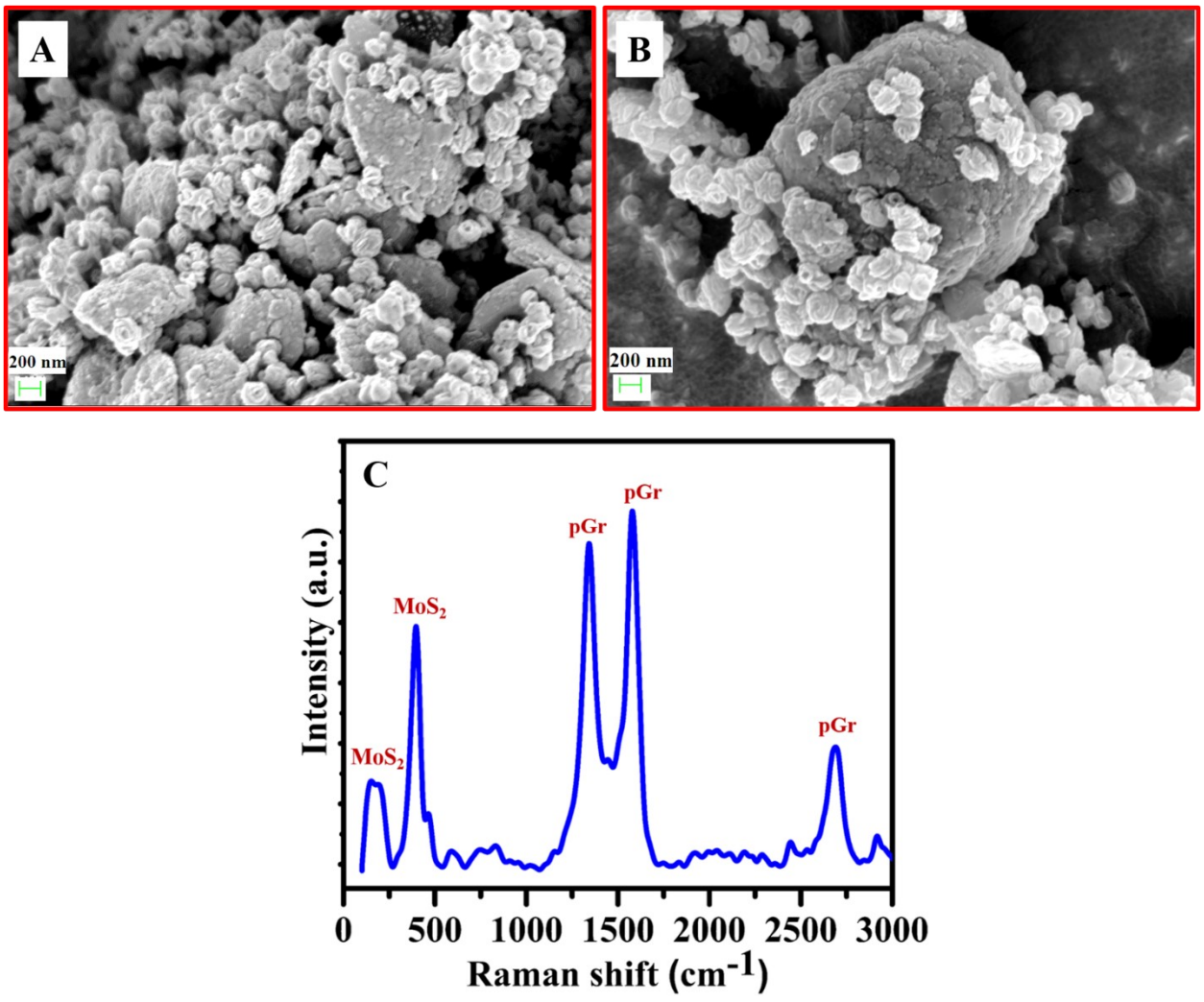

Figure.S1 (A-C): The SEM images and the Raman spectrum of pGr-MoS_2

XPS analysis of C1s, O1s, Mo 3d and S2p.

The high-resolution XPS spectra of C 1s (Fig. 1F) indicated the presence of C-C/C=C (284.7 eV) and C-O/C=O (285.8 eV) functional groups and O1s (Fig.1G) has peaks at 531.3 and 532.8 eV corresponding to C=O and C-O, respectively. The Mo (Fig 2H) displays two characteristic peaks of Mo^{4+} $3d_{3/2}$ and $3d_{5/2}$ at the binding energy values of 232.5 and 229.3 eV and a small peak at 236.2eV, which corresponds to Mo^{6+}, which is the characteristic peak for MoO_3. In addition, a small peak located at 226 eV is related to S 2s. The $2p_{3/2}$ peak which is the characteristic of S^{2-} and S_2^{2-} of S are observed at 161.3 and 163.4 eV, respectively (Fig. 1I).

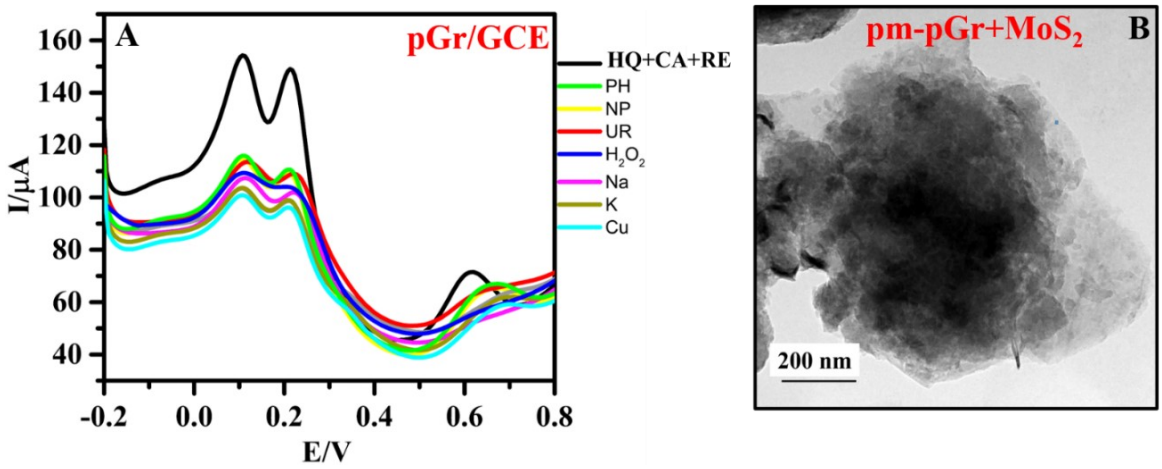

Figure.S2 (A): The DPV response for 1mM HQ, CA, and RE in the presence of various toxic contaminants on pGr/GCE and (B): The TEM image of pm-pGr+MoS_2

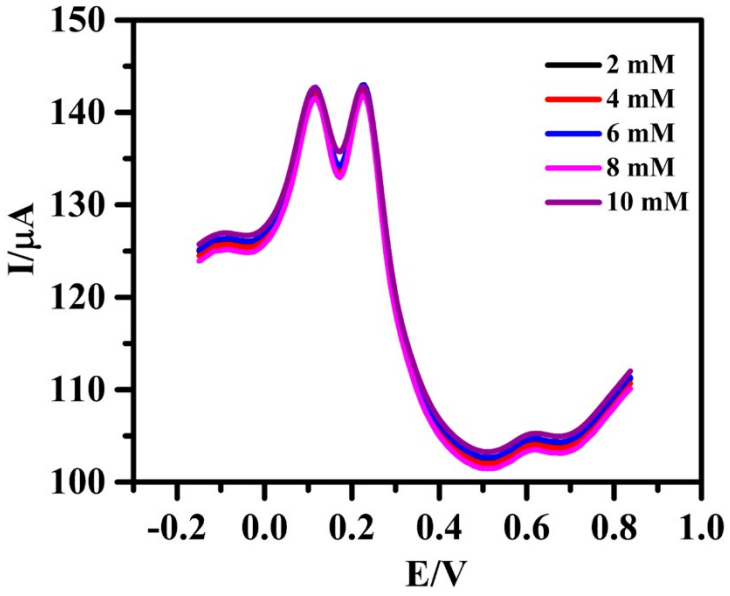

Figure S3. (A): The DPV scans obtained for higher concentrations of DHBI on pGr-MoS_2/GCE from 2 to 10 mM showing the current response reaching the saturation at higher concentration.

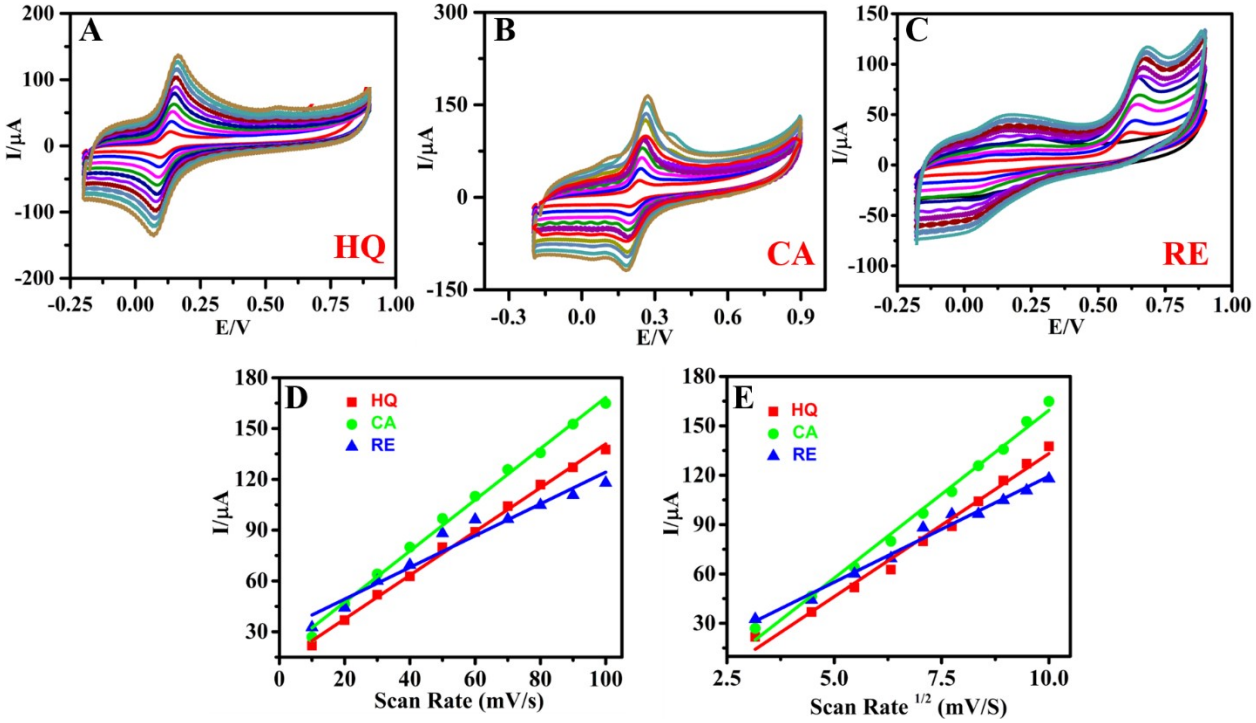

Figure.S4: The CV scans obtained for pGr-MoS_2/GCE in the presence of (A):1 mM HQ; (B): 1 mM CA; and (C): 1 mM RE with various scan rates from 10 to 1000 mV/s. (D-E): corresponding calibration curve of anodic peak currents vs. scan rates for HQ, CA, and RE.

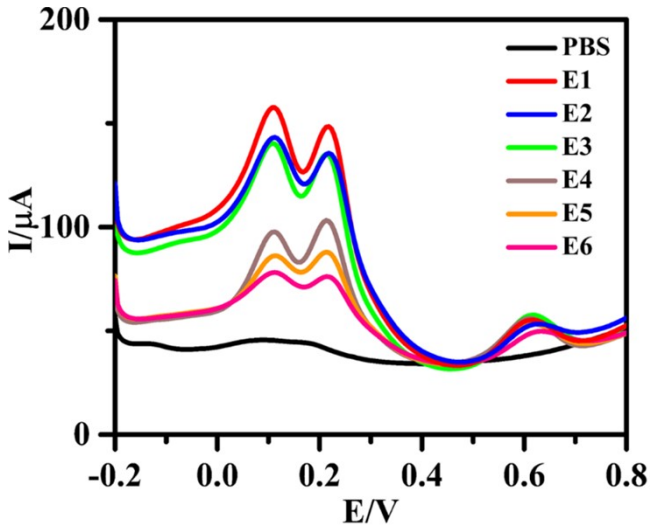

Figure. S5: DPV scans of the peak current of six independently coated electrodes showing reproducibility of pGr-MoS_2/GCE.

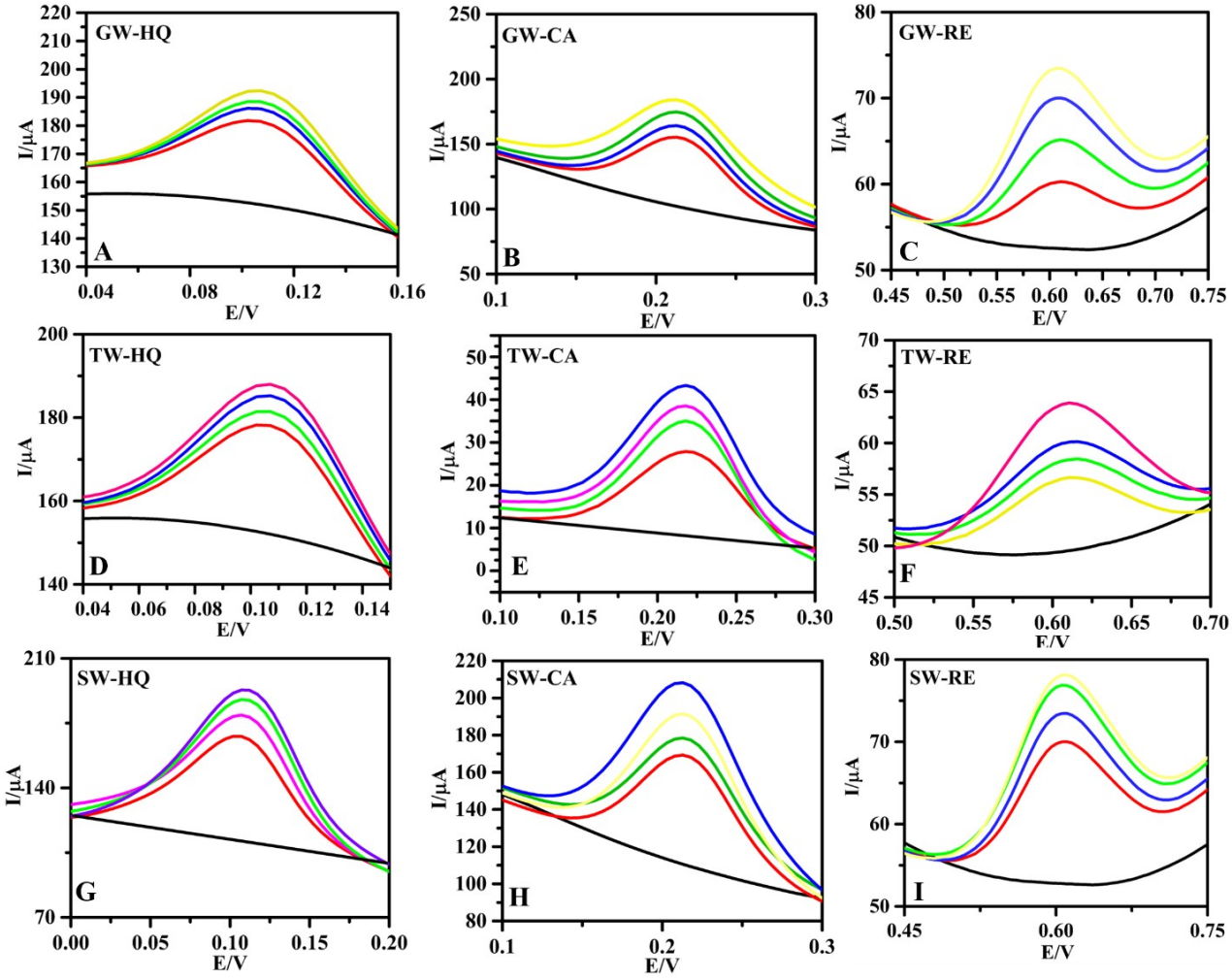

Figure. S6: The DPV response of HQ, CA, and RE on pGr-MoS_2/GCE using real samples as electrolytes: (A-C) Groundwater, (D-F) Tap water, and (G-I) Sea water as electrolyte.