Electronic Supplementary Material (ESI) for Analyst.

Supporting Information

Insight into the Role of Nitrogen in N-Doped Ordered Mesoporous Carbons for Spontaneous Non-covalent Attachment and Electrografting of Redox Active Materials

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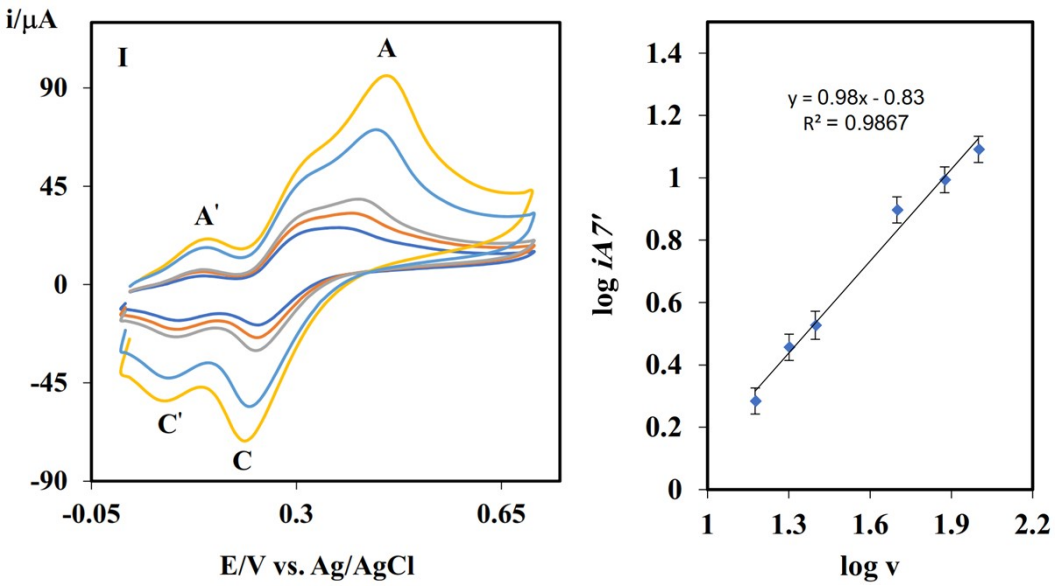


Figure S1: (I) Cyclic voltammograms of 2 mM catechol on GIOMC/GC electrode in aqueous solution with pH of 6 at different scan rates, (II) The plot of logi-logv for voltammograms in Part I. Reference electrode: Ag/AgCl.

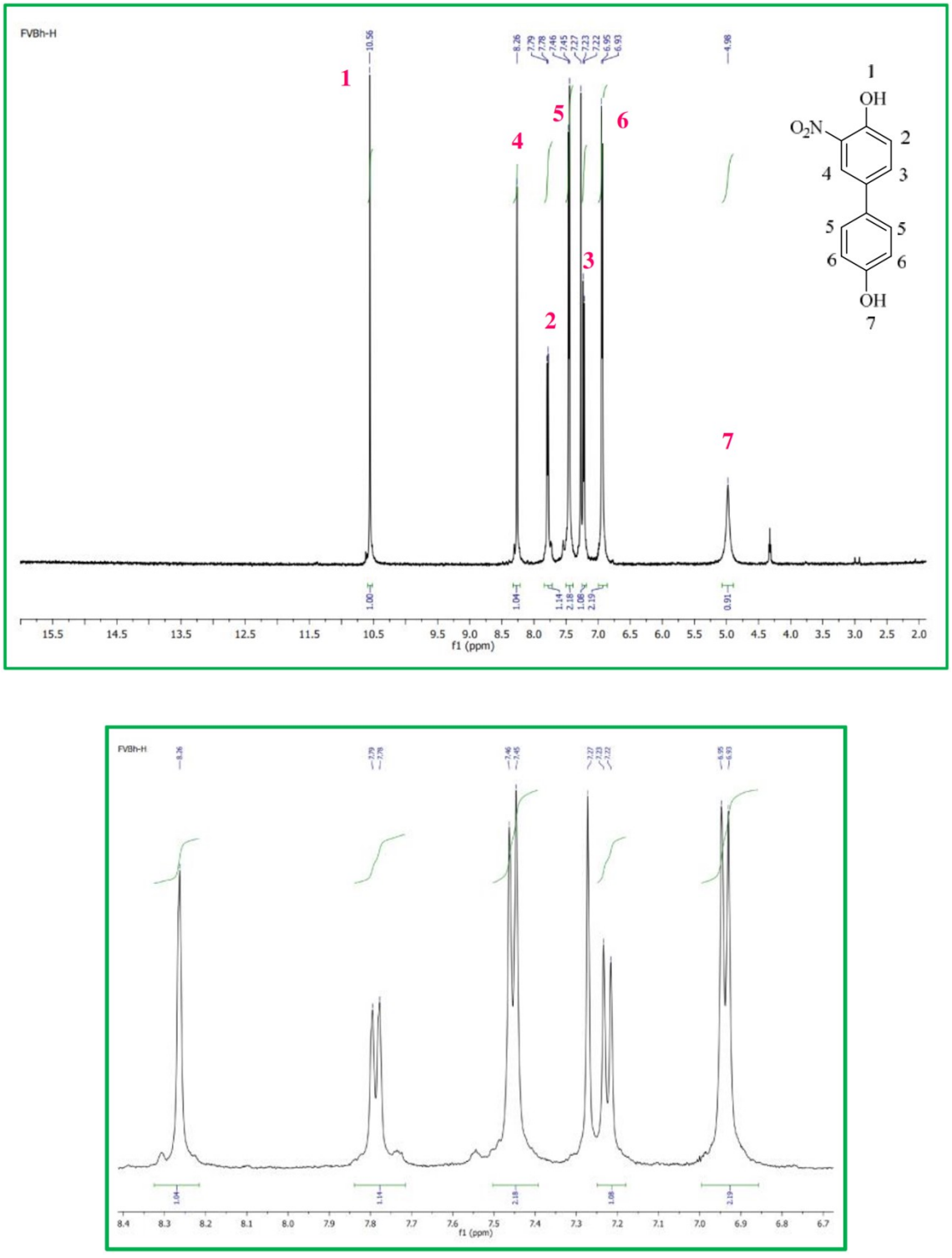


Fig. S2. [1]HNMR spectra of the NBPh

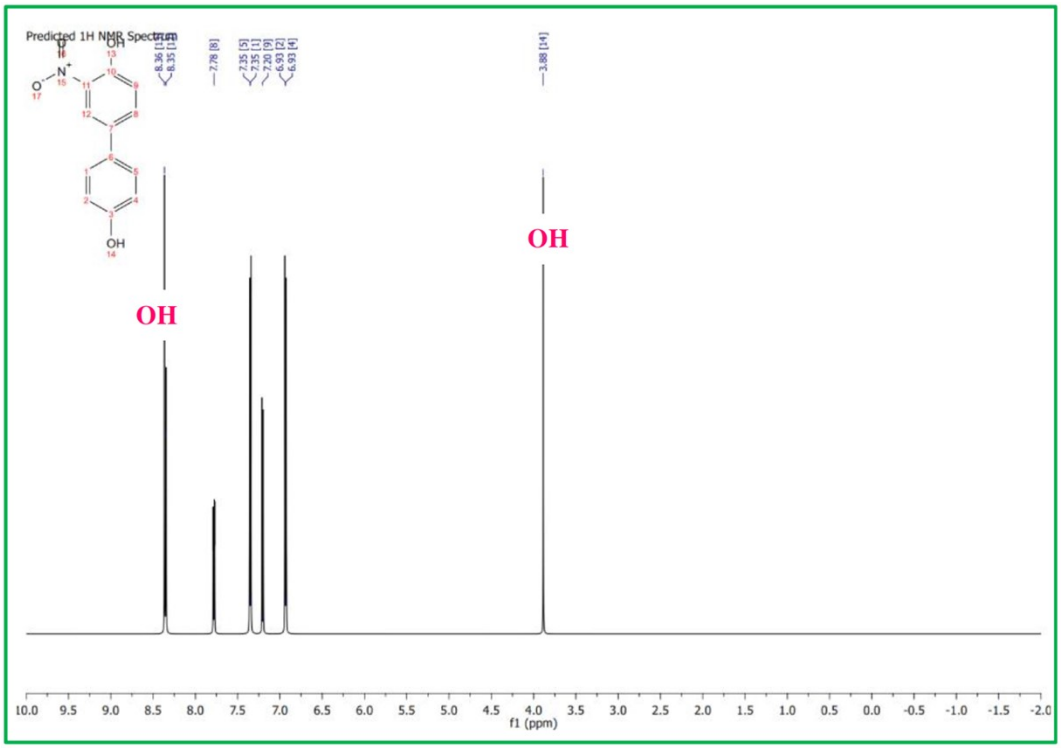


Fig. S3. Simulated ^{1}HNMR spectra of the NBPh

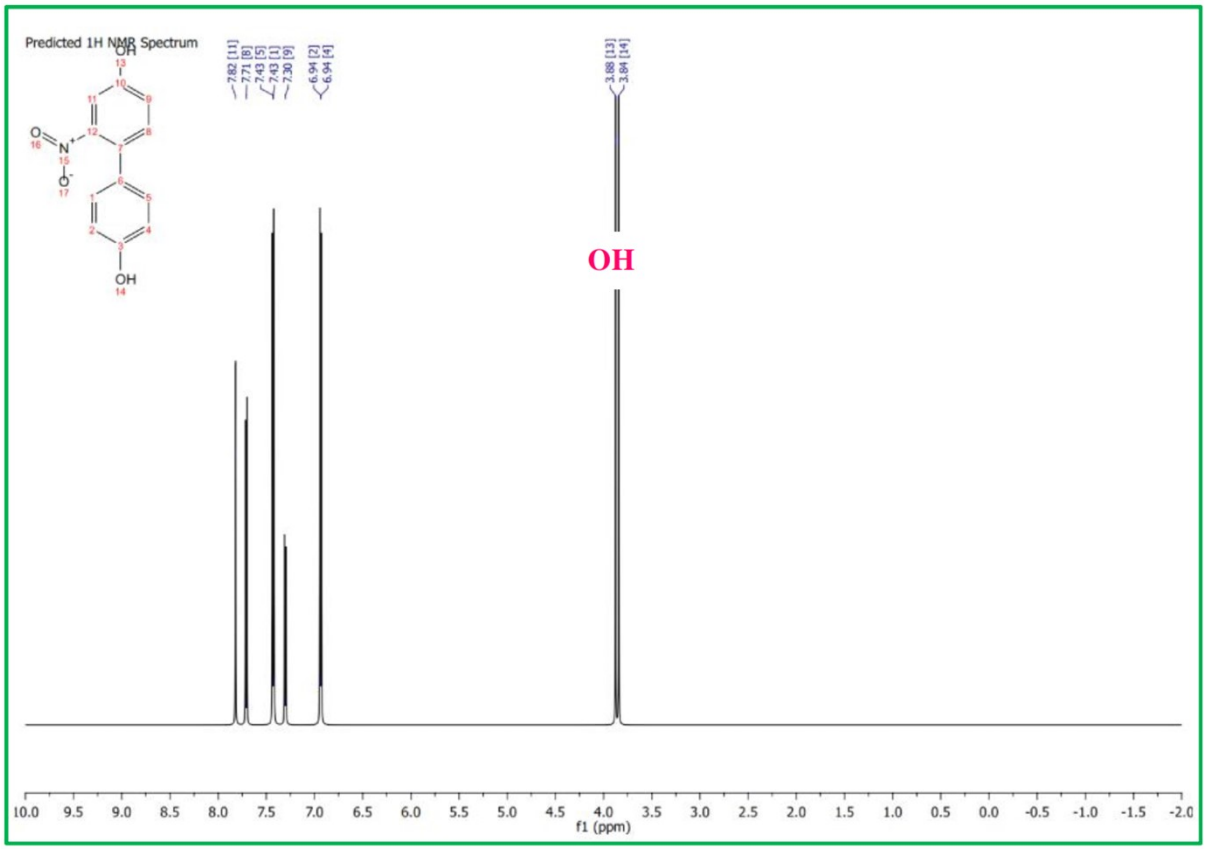
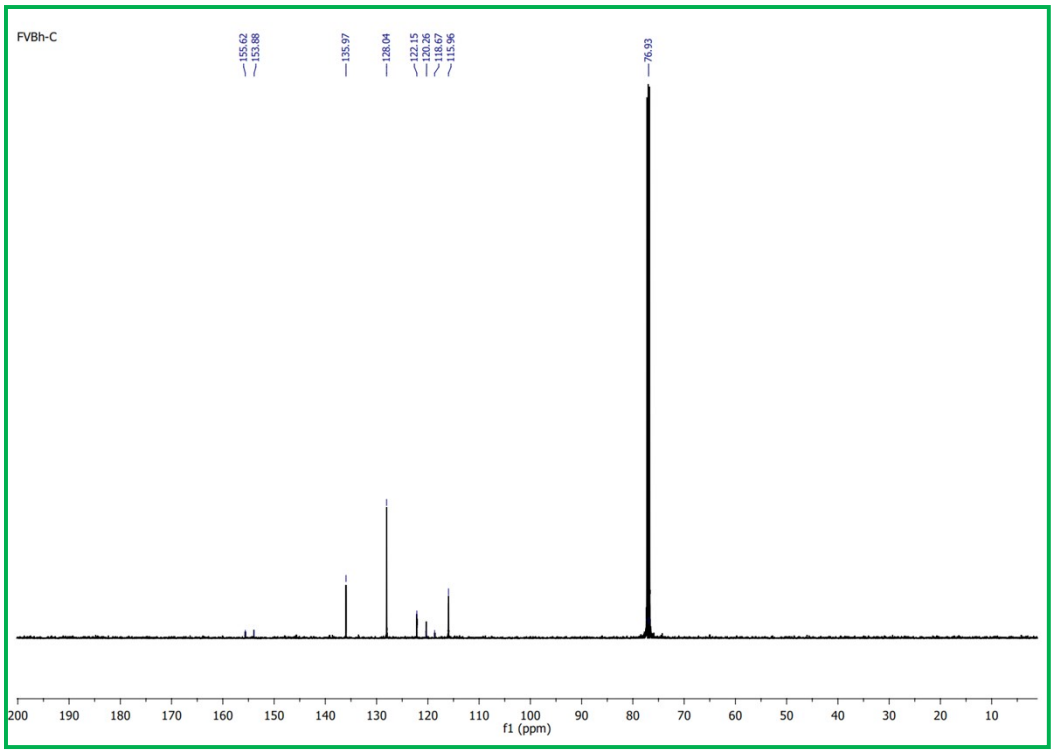


Fig. S4. Simulated ^{1}HNMR spectra of the NBPh'



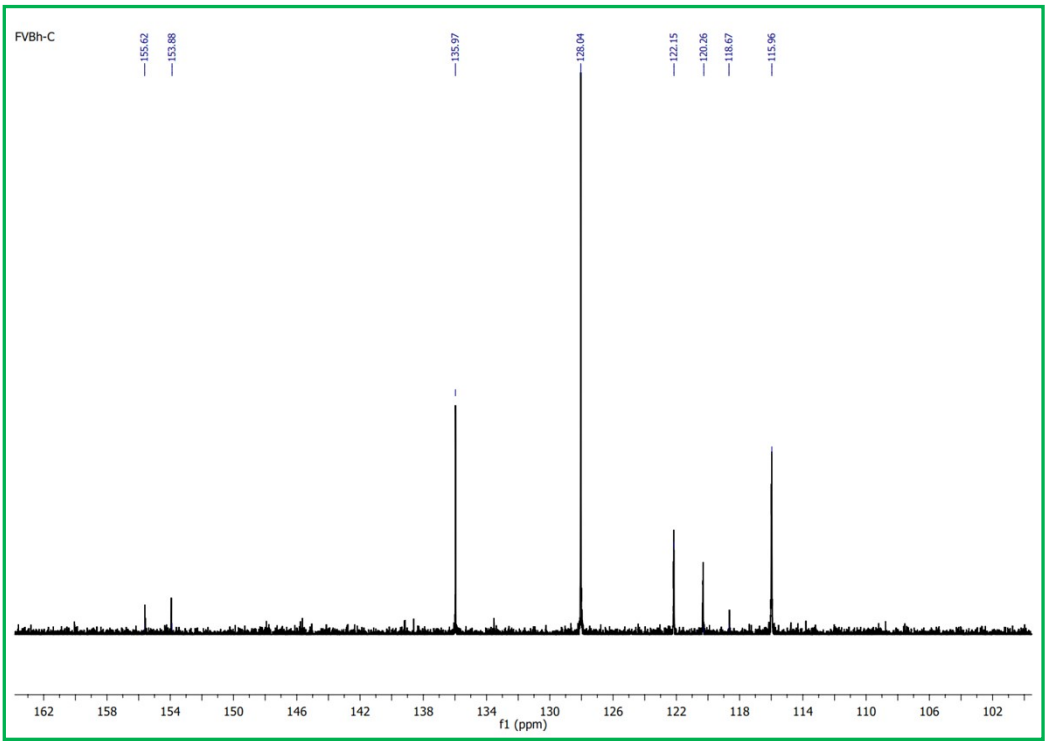


Fig. S5. ^{13}CNMR spectra of the NBPh

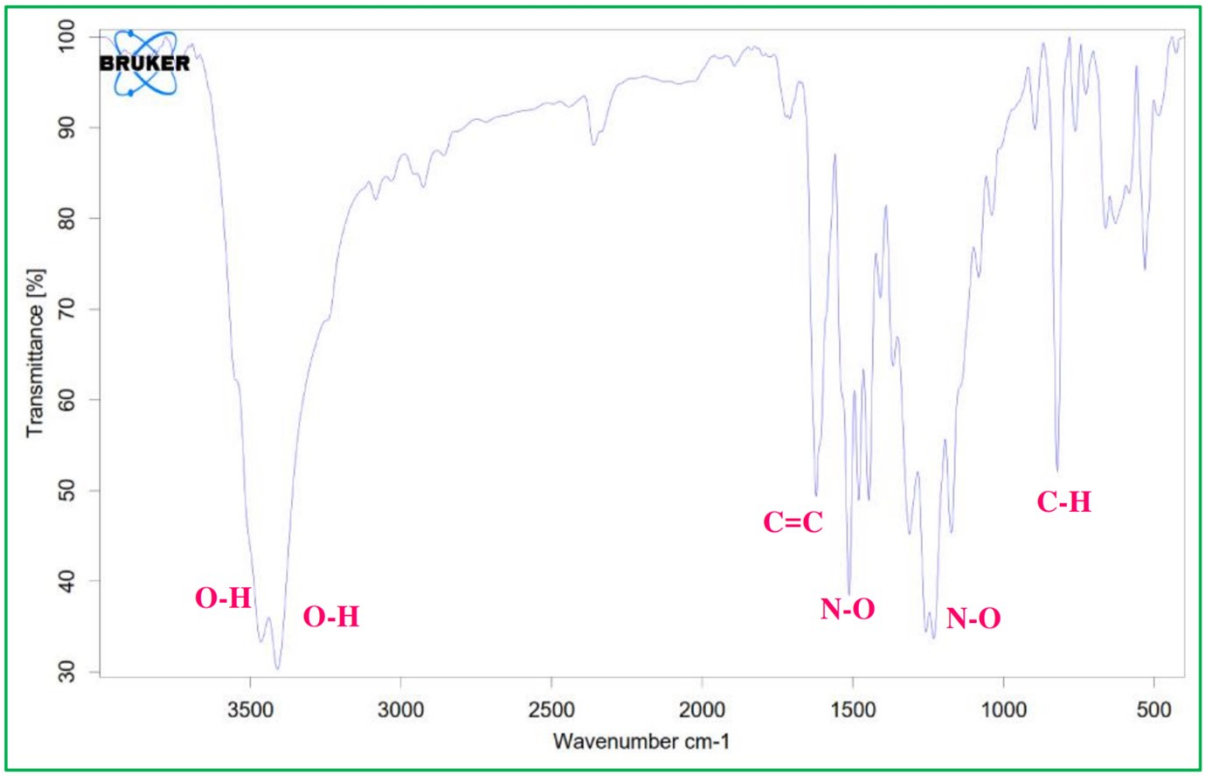
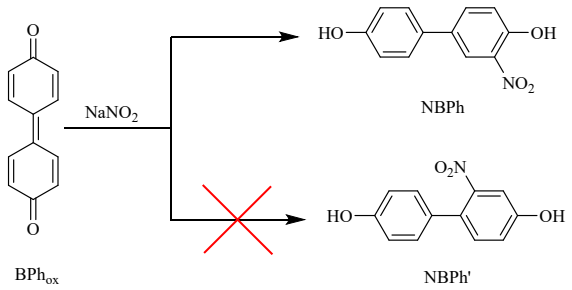


Fig. S6. IR spectra of the NBPh

The product of nitration of BPh was characterized by spectroscopic data (Figs. S2, S5 and S6). The appearance of a singlet signal in ^{1}HNMR (Fig. 2S) at 8.26 ppm clearly confirms the substitution of a nitro functional group on the phenyl ring. It should also be noted that two possible pathways are considered for nitration of the aromatic ring (Scheme S1). A Comparison between the simulated spectra of NBPh (Fig. S3) and NBPh' (Fig. S4) with the experimental results implies that NBPh has been produced as the final product.



Scheme S1: Two different pathways for the nitration of BPh

In order to make a better comparison between the electrochemical behavior of BPh and NBPh, the voltammetry of 1 mM NBPh was also conducted through the consecutive addition of BPh followed by exerting different potential window from -1 to +0.9 V (Fig. S7I) and 0 to +1 V (Fig. S7II). Appearance and gradual increase the height of A_1/C_1 corresponded to BPh electrode process clearly highlights the notion that the oxidation potential of BPh is to some extent lower than that observed for NBPh. More difficult oxidation of NBPh, as expected, is due to the presence of electron-withdrawing nitro group in close proximity to the redox center of the molecule.

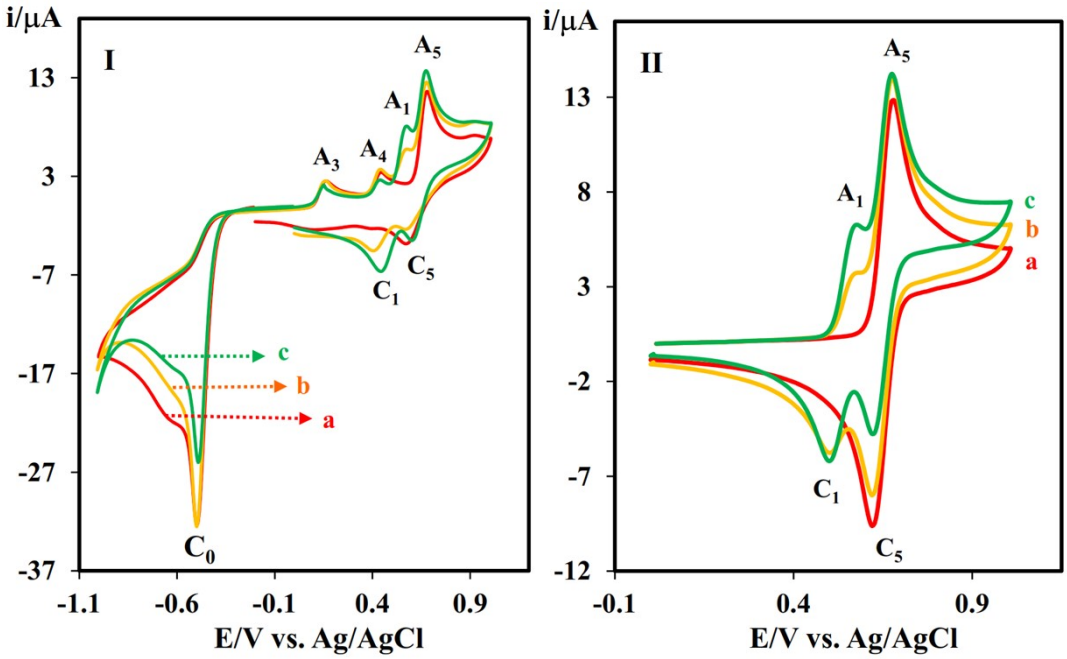


Fig. S7. Cyclic voltammograms of 1 mM NBPh (a) in the absence and (b and c) by gradual increasing of BPh.

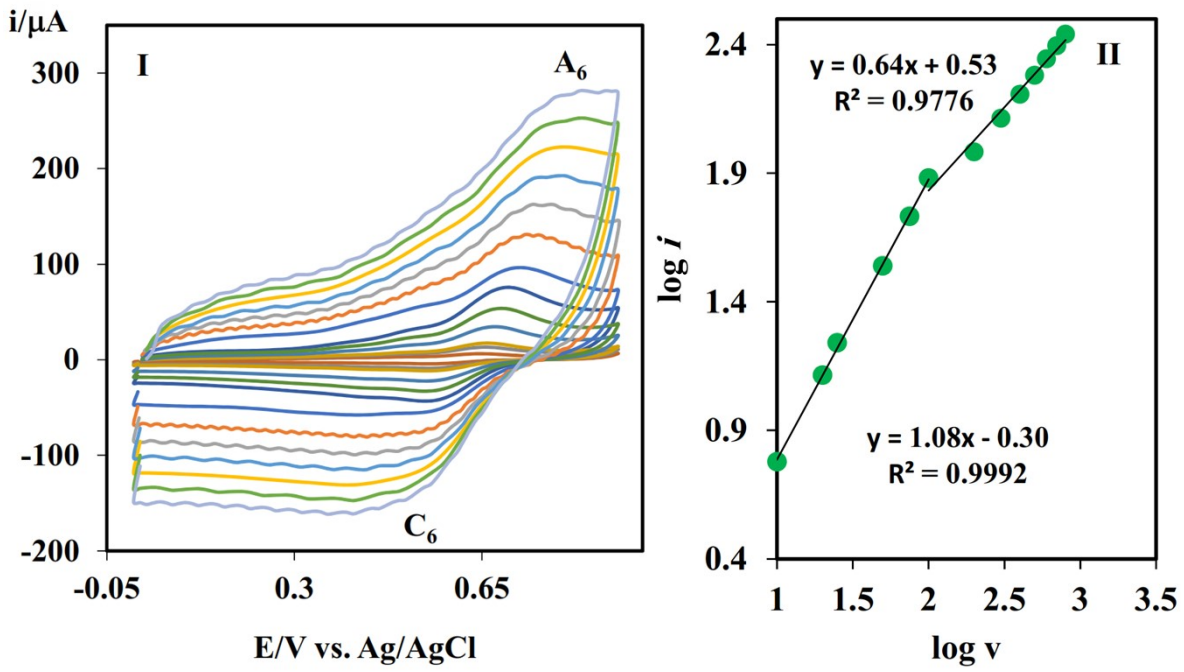


Fig. S8. (I) Cyclic voltammograms of BPh/GIOMC/GC in aqueous phosphate buffer solution at different scan rates, Reference electrode: Ag/AgCl (II) the plot of logi-logv for A_6

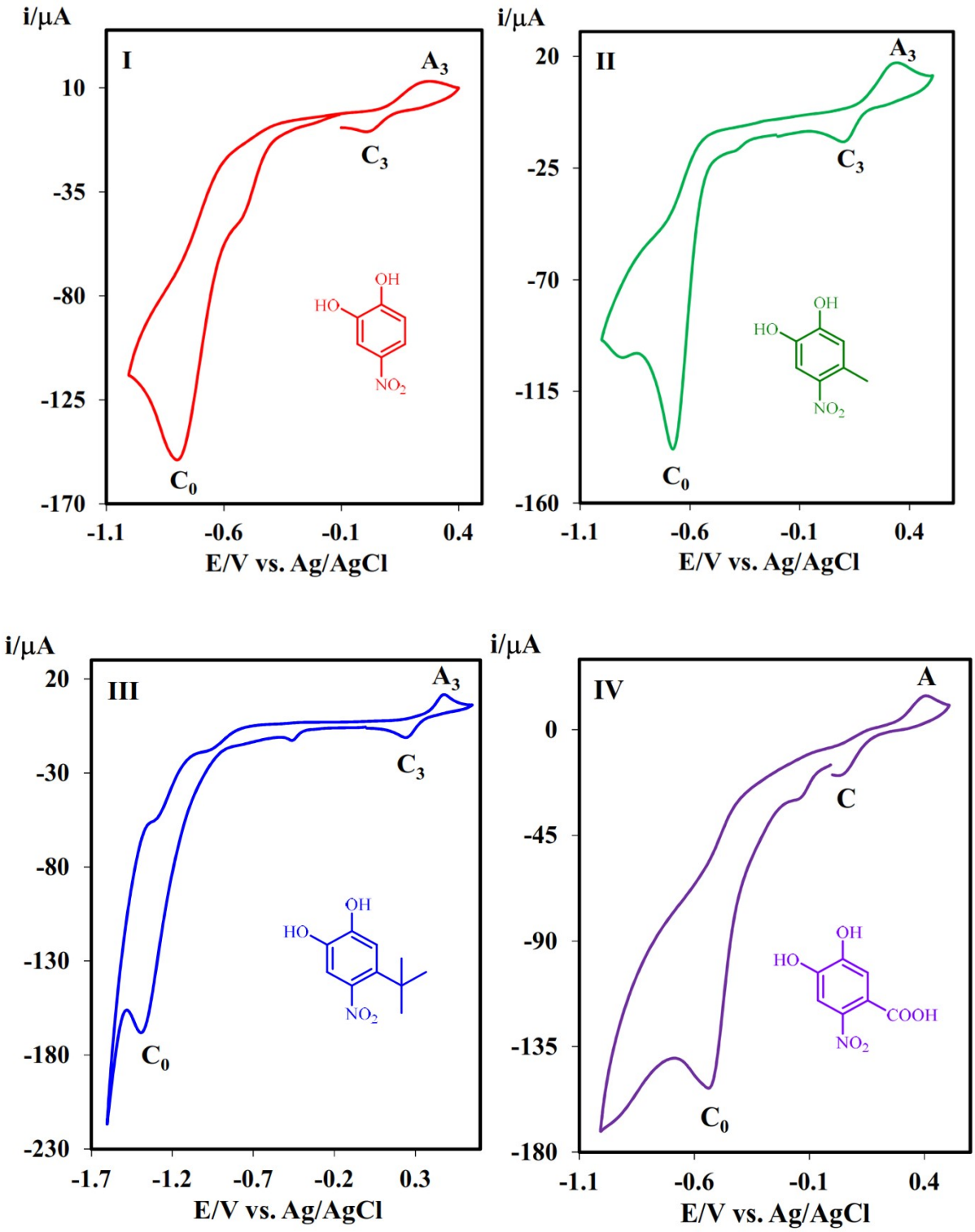


Fig. S9. Cyclic voltammograms of the products resulted from the nitration of catechols,

Reference electrode: Ag/AgCl

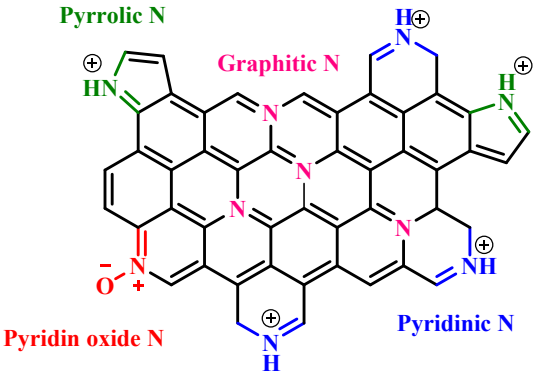


Fig. S10. GIOMC in acidic solution

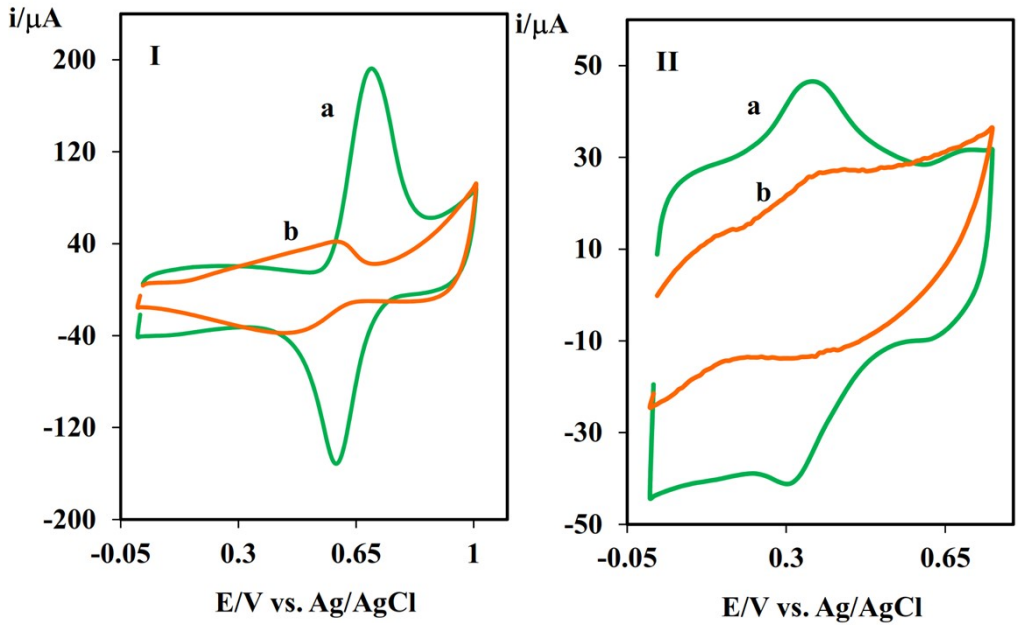


Fig. S11: Cyclic voltammogram of 2 mM solution of I) catechol, II) ferrocyanide on the electrode surface modified with GIOMC in a) 0.1 M HCl solution and b) 0.1 M KCl solution, Reference electrode: Ag/AgCl.