Supplementary Information (SI) for Environmental Science: Nano.

Supporting Information

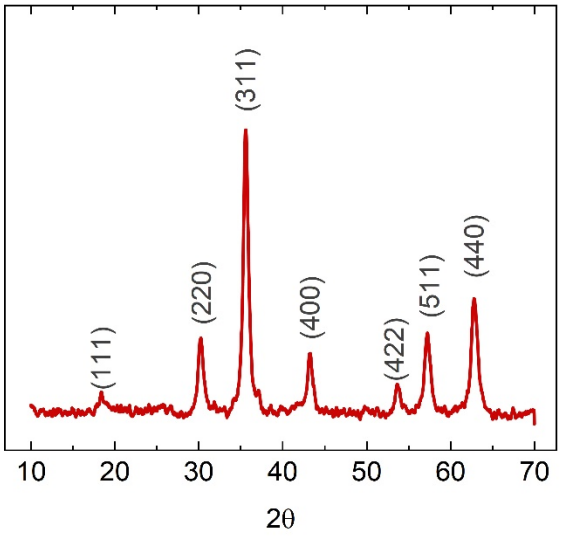

Figure S1: X-ray diffraction (XRD) diffractogram of @COOH. Miller indices corresponding to Fe3O4 phase are also labeled.

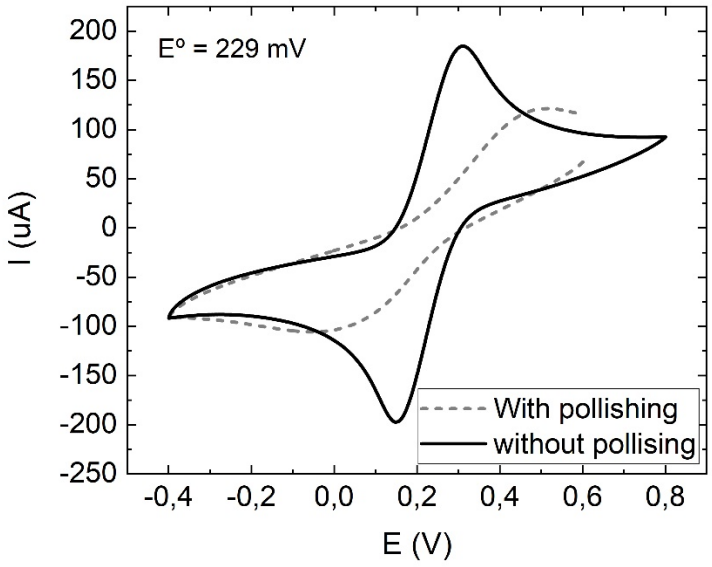

Figure S2: Cyclic voltammetry on the MGCE after polishing with 0.05 µm alumina or without polishing, using a solution of ferrocyanide/ferricyanide at 1 mM in KCl 100 mM.

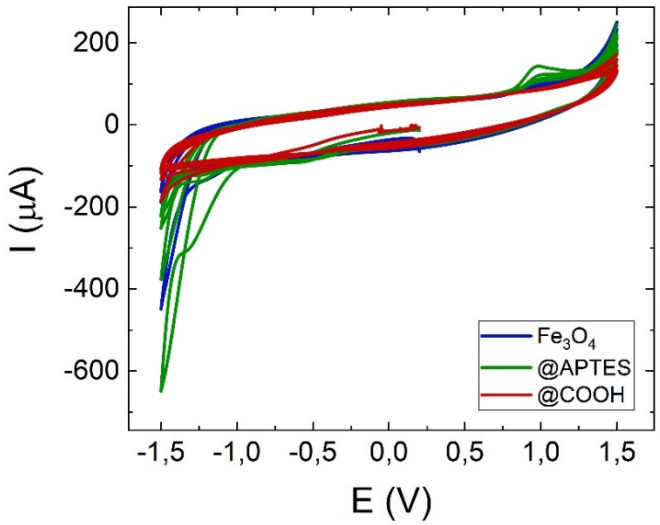

Figure S3: Cyclic voltammetry Fe_3O_4, @APTES and @COOH after NPs incubation (10 minutes) in KNO3 100 mM pH 2.5 From Open circuit Potential to -1.5 V to 1.5 V at 50 mV/s.

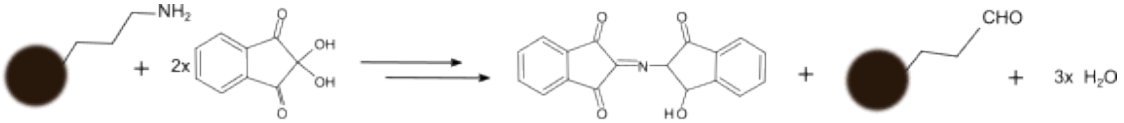

Figure S4: Scheme of Ninhydrin reaction with amine groups on @APTES surface.

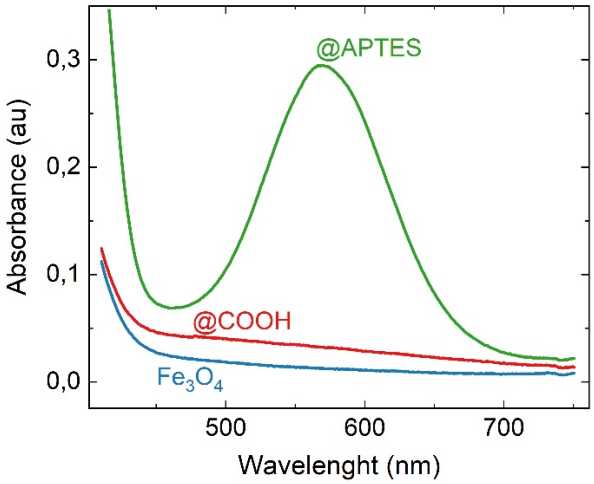

Figure S5: UV-VIS spectra of for Fe_3O_4, @APTES and @COOH in ninhydrin/ethanol solution.

Preliminary study on the behaviour of the MNPs on the magnetic electrode

To evaluate the behaviour of MNPs on the MGCE, a drop of MNPs suspension was placed on the surface of the electrode in vertical position with the glassy carbon surface up. The drop on the surface was filmed with a Navitar long working distance microscope coupled with Sony B&W CCD camera. The MNPs rapidly falls to the surface and, as seen in Figure S4 a), they form needle-like structures perpendicular to the surface, aligned with the magnetic field. When this drop is let to dry and then observed by SEM (Figure S4 b)) the needle structures are composed of MNPs chains, which are now agglomerated horizontally on the surface, as a result of the solvent drying.

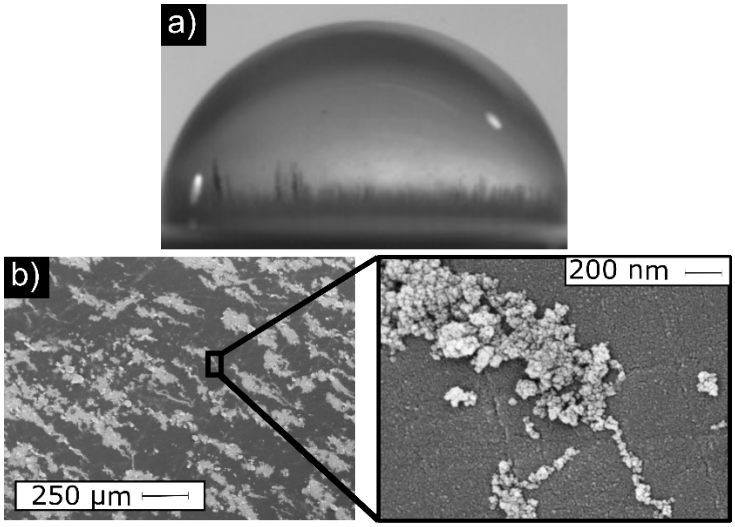

Figure S6: a) Drop of 20 µL of NPs suspension (1 mg/mL) on the MGEC after 30 seconds observed with a long working distance microscope. b) SEM images of the drop on the electrode surface after drying.