Oxidized graphene and graphite as metal-free catalysts for aqueous sulfide oxidation

Bruno R. S. Lemos[1], Ivo F. Teixeira[1], Bruno F. Machado[2], Marcos Roberto Abreu[1], João P. de Mesquita[1], Ronny R. Ribeiro[3], Revathi R. Bacsa[2], Philippe Serp[2,*], Rochel M. Lago[1,*]

Supplementary Material

1. Tables

Table S1 - Average diameter of graphites and graphenes obtained.

Sample	λ / nm	2θ / °	d_{002} / nm	L_a / nm	L_c / nm
GT	0.1540	26.5388	0.3355	42.6	20.6
GT-80	0.1540	26.5603	0.3352	44.1	21.3
GT-140	0.1540	26.5102	0.3358	44.1	21.3
GN	0.1540	26.2870	0.3386	22.7	11
GN-80	0.1540	26.3362	0.3380	21.7	10.5
GN-140	0.1540	26.2498	0.3391	23.3	11.3

Table S2 – Raman data of graphenes and graphites.

	G position/cm^{-1}	G' position/cm^{-1}	G FWHM	G' FWHM	$I_{G'}/I_G$
GN	1576.32	2650.94	35.29	59.94	1.02
GN 80	1579.40	2656.74	37.84	98.05	1.78
GN 140	1578.95	2656.83	30.97	51.50	1.16
GT	1580.11	2664.76	34.95	73.29	1.11
GT 80	1582.96	2663.24	35.13	68.98	0.74
GT 140	1582.42	2663.97	31.16	76.64	0.25

2. Figures

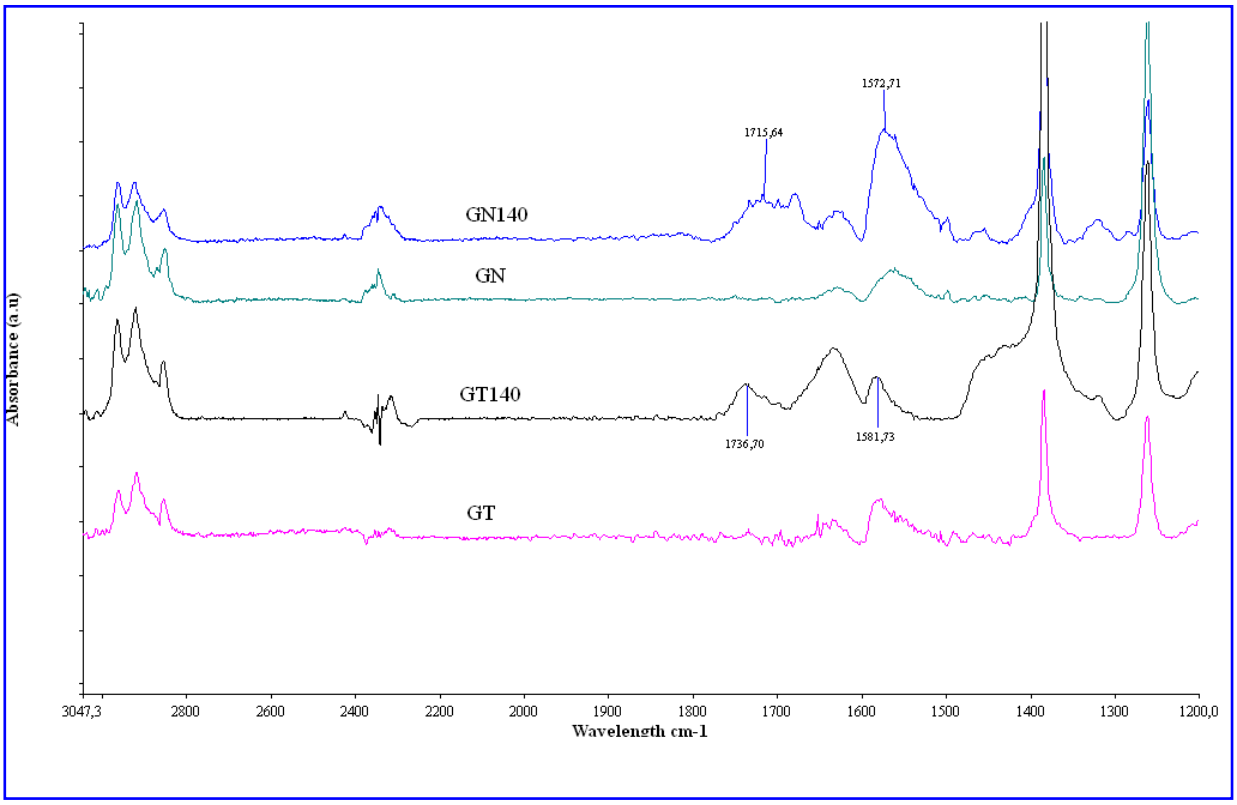

Figure S1: FTIR spectra of GN and GT in KBr before and after functionalisation with HNO_3 at 140°C.

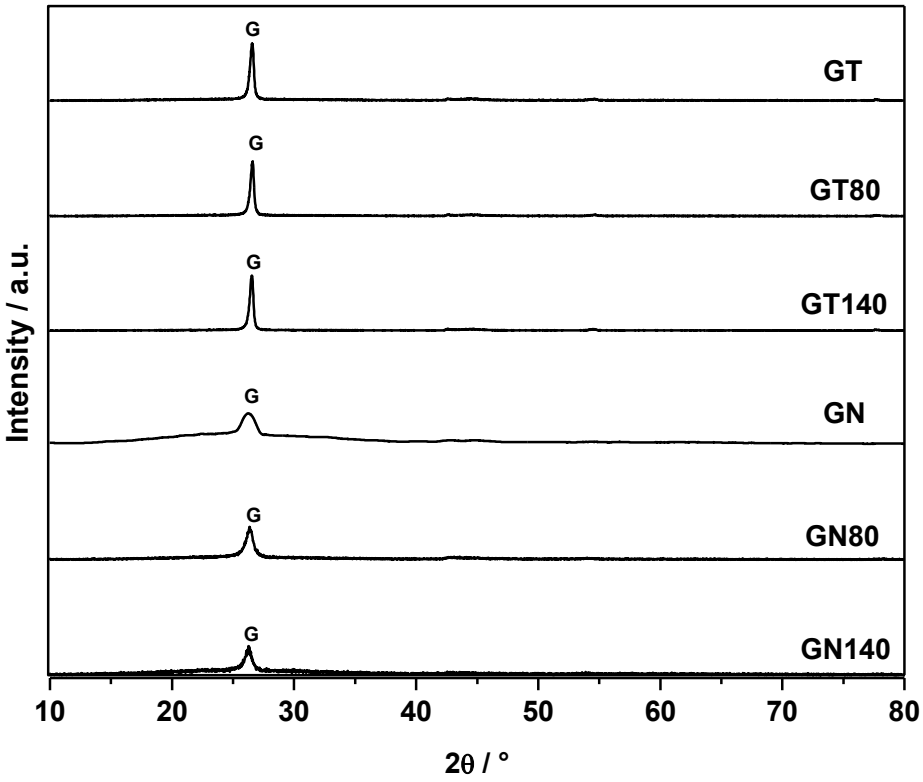

Fig. S2 - Diffractograms of graphenes and graphites functionalizated by treatment with HNO_3.

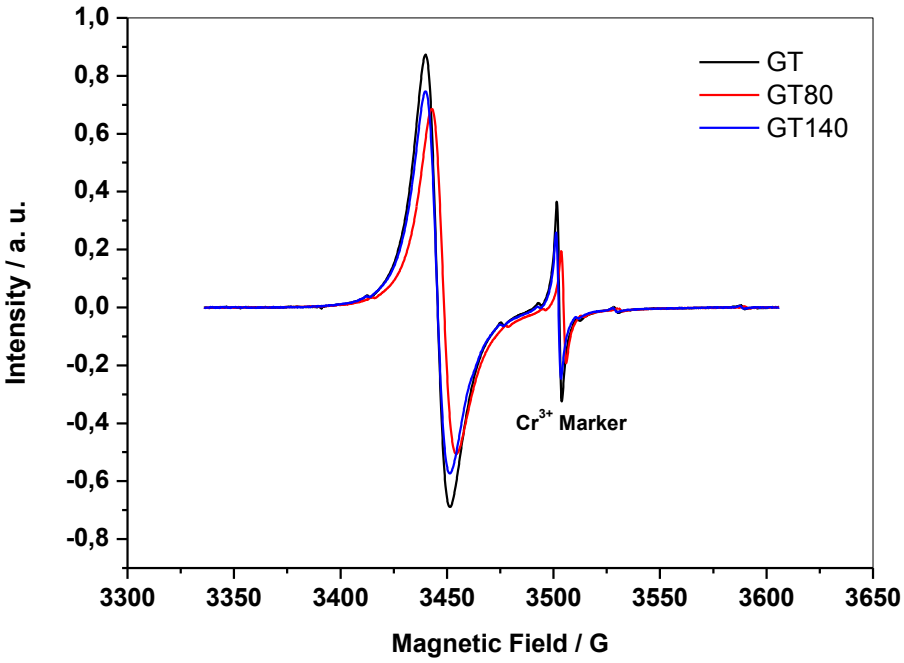

Fig. S3 - Room temperature Electron Paramagnetic Resonance spectrum of the graphite samples. The absolute line areas are normalized to the Cr^{3+} marker and the sample masses.

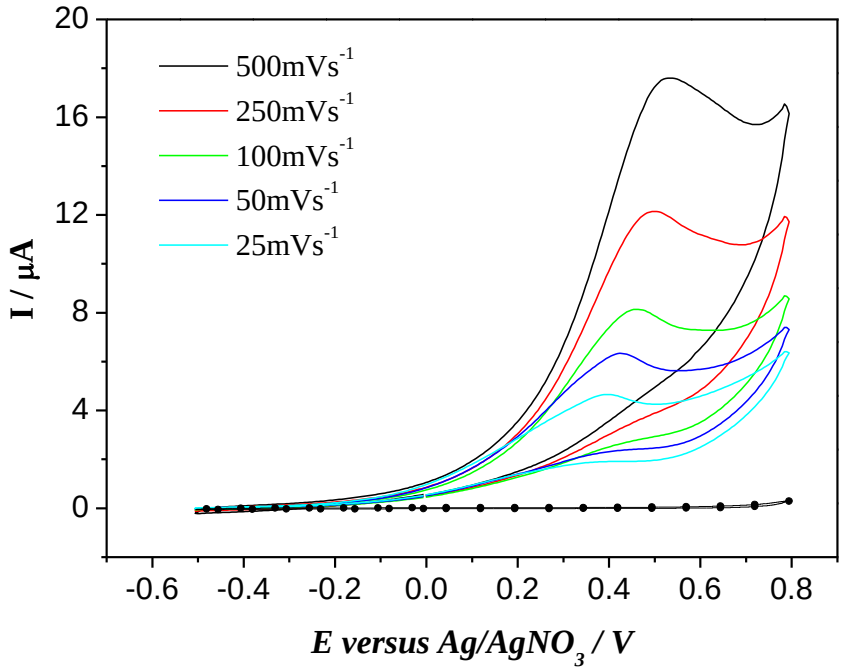

Fig. S4 - Overlaid cyclic voltammograms of GT carbon paste electrode at different scan rates in presence of 1 mM Na_2S.

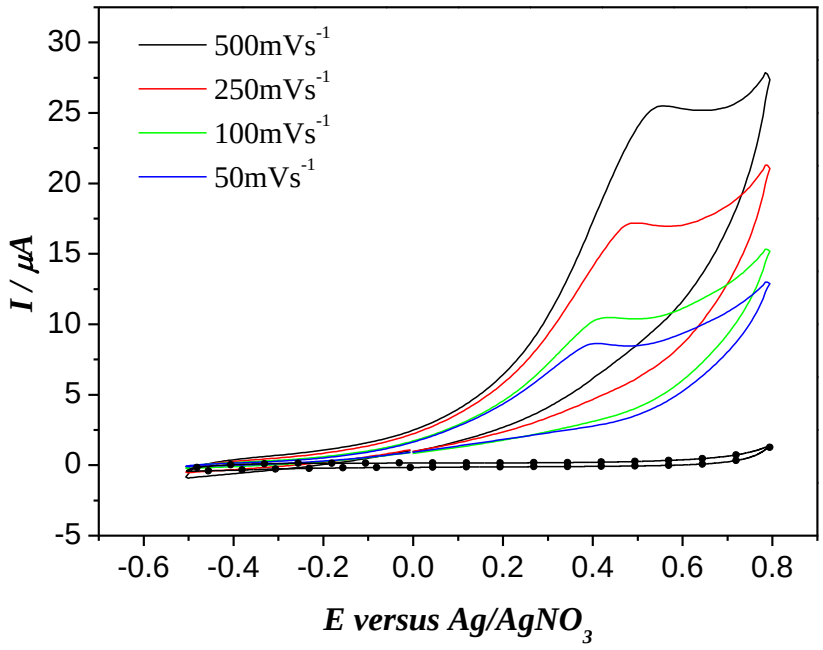

Fig. S5 - Overlaid cyclic voltammograms of GT80 carbon paste electrode at different scan rates in presence of 1 mM Na_2S.

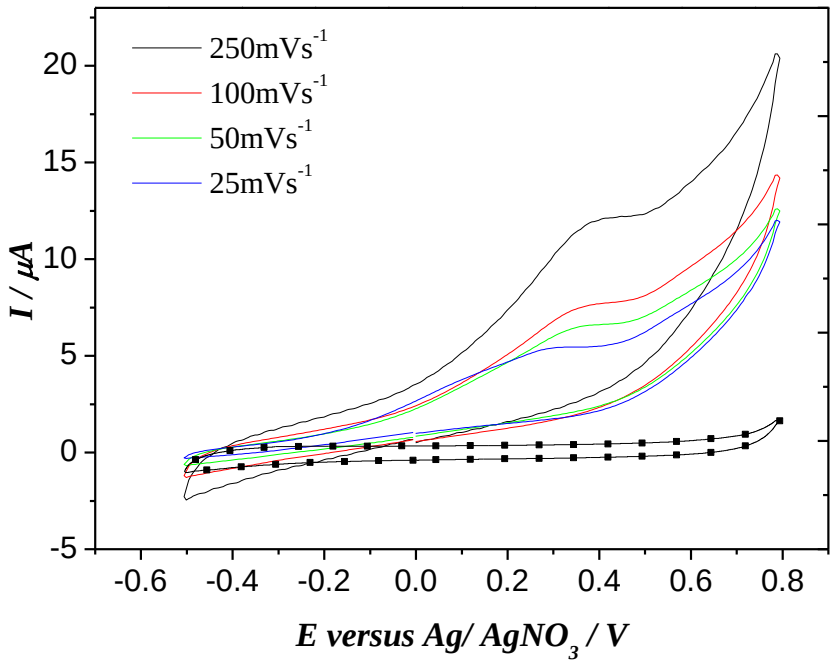

Fig. S6 - Overlaid cyclic voltammograms of GT140 carbon paste electrode at different scan rates in presence of 1 mM Na_2S.

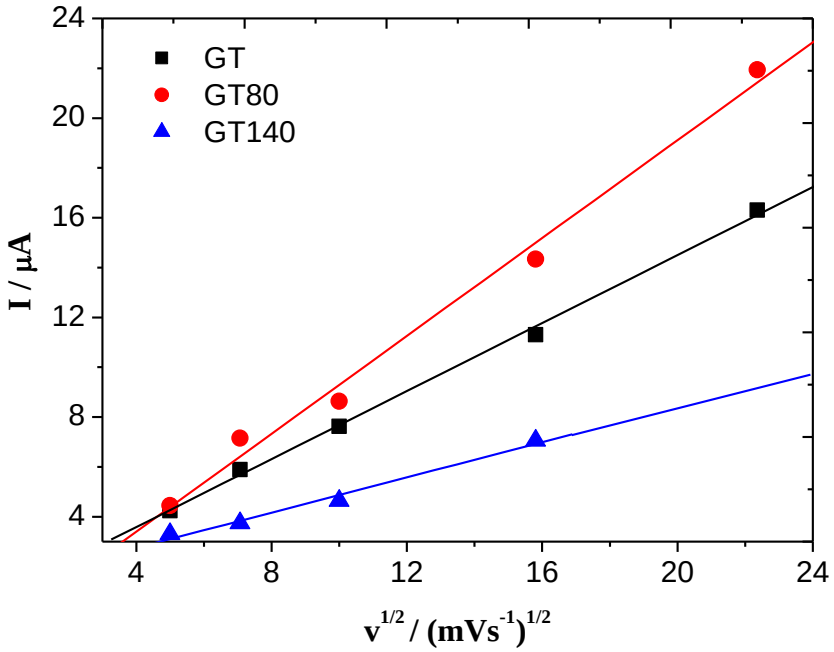

Fig. S7 - Plot of anodic peak current of sulfide oxidation *vs.* square root of scan rate obtained with carbon paste electrodes prepared with different graphites.