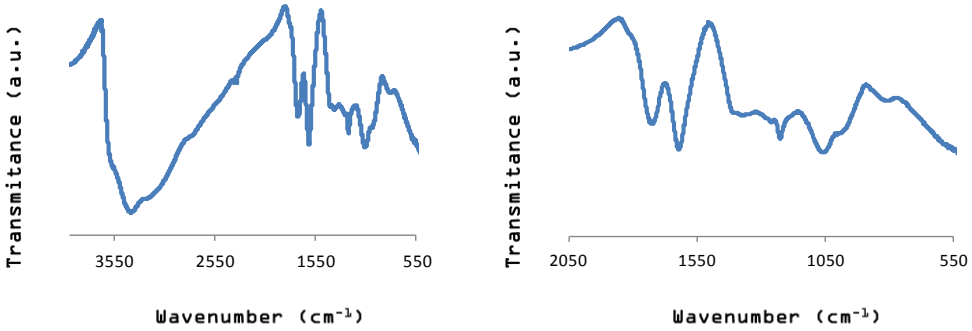
Graphene Oxide Characterization sheet

Reported data: FTIR Spectroscopy, Scanning Electron Microscopy, elemental analysis, %Mn by ICP-OES, X-ray diffraction (XRD), X-ray Photoelectron Spectroscopy (XPS), Zeta-potential and solid state 13C Nuclear Magnetic Resonance (NMR).

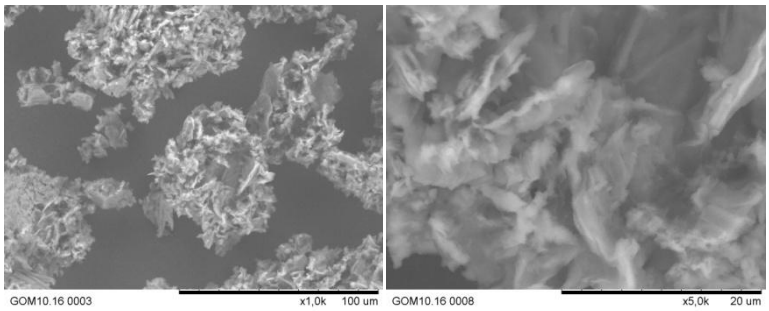
- FTIR Spectroscopy



Left, full spectrum. Right, magnification between 2000 and 900 cm^{-1} wavenumbers.

Assignment (cm^{-1}) 1713 C=O (carbonyl/carboxy); 1611 C=C (aromatics); 1388 C-O (carboxy); 1217 C-O (epoxy); 1043 C-O (alkoxy).

- Scanning Electron Microscopy



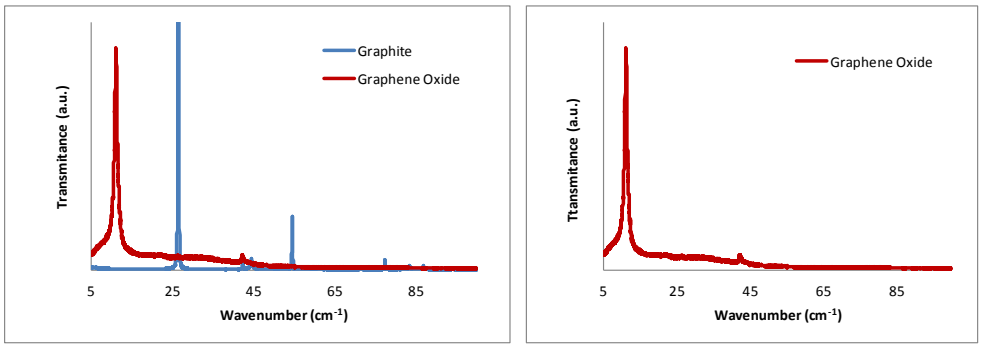
- Elemental analysis

	%C	%H	%N	%S
GO	54.9	2.32	0.04	0.8

- %Mn by ICP-OES

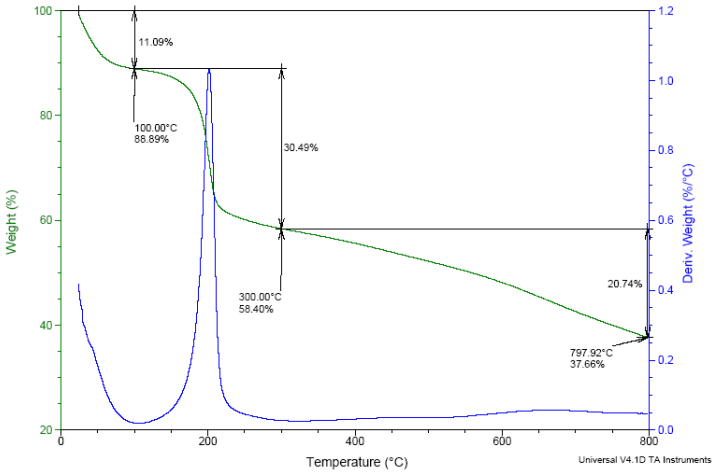
The residual amount of Mn in graphene oxide measured by ICP-OES is 0.05%.

- XRD



Left, XRD pattern for as-prepared graphene oxide bulk material. Right, comparison between XRD patterns of graphene oxide and graphite starting material evidencing that complete oxidation have occurred.

- TGA

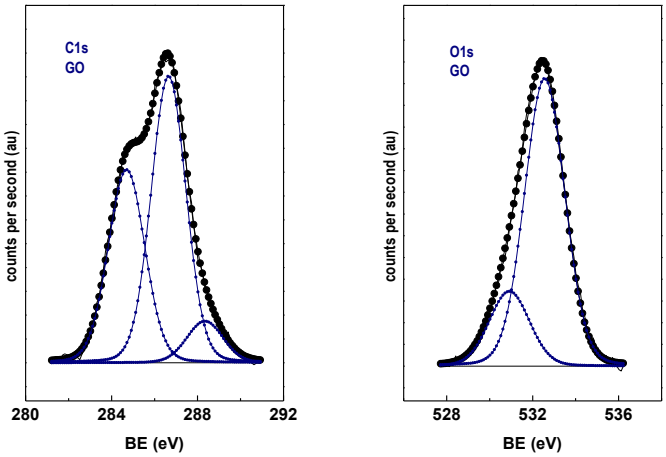


The first 11.9% mass loss (approx 100º C) it is due to water solvent molecules absorbed into the GO bulk material, the following 30.49% decrease at 300º C stands for GO decarboxylation process, further decomposition takes place up to 800ºC.

Experiment settings: temperature scanning rate: 1 C/min; temperature range 20-800 C; purging inert gas: N2

- XPS

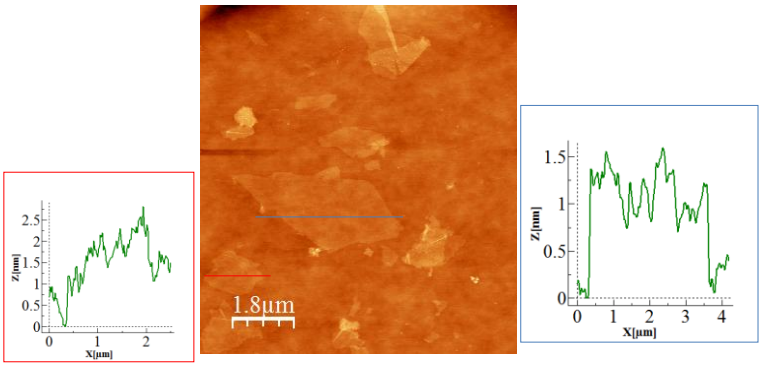
	C1s	O1s	O/C atomic ratio
GO	284.8 (38) 286.6 (54) 288.3 (8)	530.9 (21) 532.5 (79)	0.655



Binding energies (eV) and deconvoluted peaks (%) for C1s, O1s core levels.

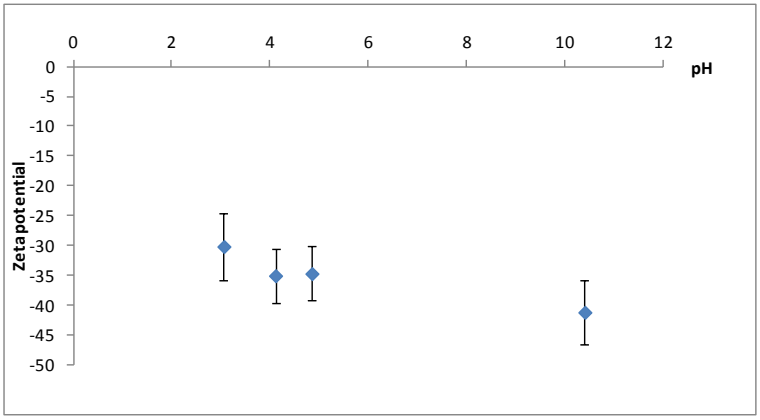
Assignment (eV): 284.8 C-C 530.9 C=O
286.6 C-O 532.5 C-O
288.3 C=O

- AFM



AFM topographic image and magnification of GO deposited onto a silicon wafer. The high profile of the observed GO flakes correlates accordingly calculated values (0.7-1.2 nm).

- Zeta-potential



Zeta-potential versus pH curve.

- Solid state 13C NMR