CHARACTERISATION NOTE

PRODUCT: GRAPHENE OXIDE, powder

SECTION 1: Identification of the substance/mixture and of the undertaking

Product name:	Graphene oxide
Synonyms:	GO, graphene oxide flakes, GO flakes, GO powder
Manufacturer:	Institute of Electronic Materials Technology 133 Wólczyńska str., 01-919 Warsaw, POLAND phone: +48 22 639 58 52
Chemical name:	Graphene oxide
Chemical formula:	$C_xO_yH_z$
Application:	Laboratory chemicals, manufacturing of substances, barrier coatings, membranes, biomedical applications, fillers

SECTION 2: Basic properties

Appearance:	From very light to very dark brown
Odour:	Flavourless
Bulk density:	0.0037 g/cm^3
Specific surface area:	5 m^2/g (conventional drying method)
	11 m^2/g (alternative drying method)
Solubility in water:	Creates homogenous suspensions
Stability:	Stable in the air (if stored properly)
Storage:	In an airtight container to protect against UV radiation, in a dry and cool place

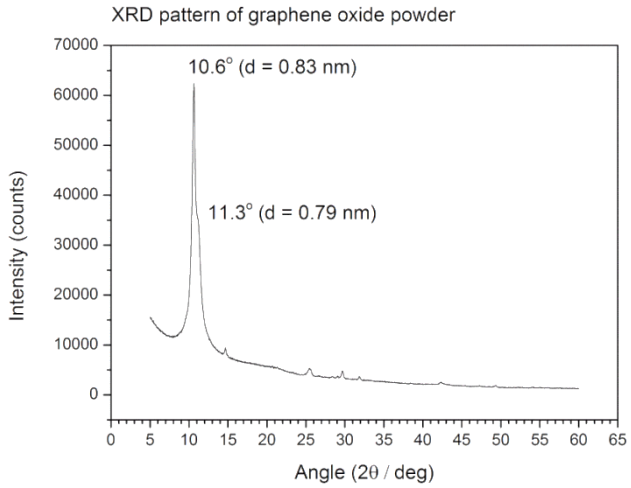
SECTION 3: Composition/information on ingredients

Carbon	40-42%
Oxygen	45-52%
Sulfur	1-3%
Nitrogen	<0.3%
Hydrogen	2.5-3%

SECTION 4: Physical properties

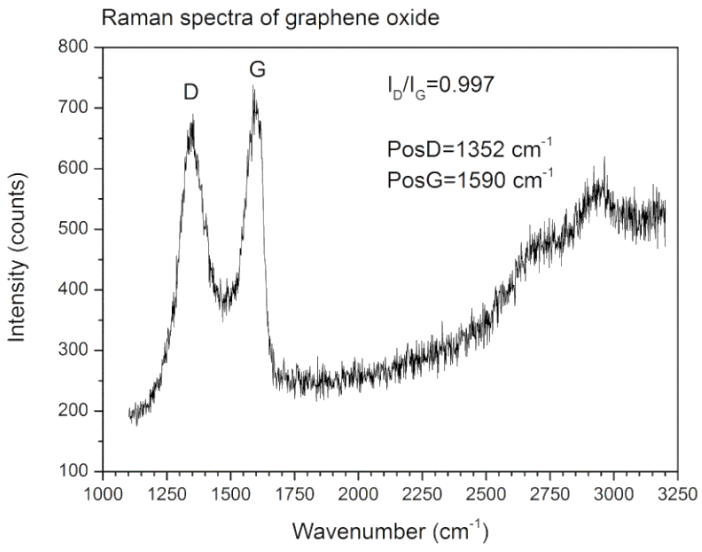
XRD

X-ray diffraction pattern with reflections from the Bragg-grating plane (002).
The average distance between layers is: ~0.9 nm. Number of layers in the package: ~11

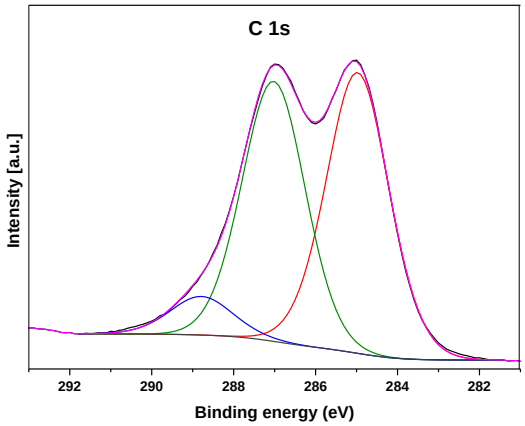


Raman spectroscopy

Raman spectrum of modes characteristic for graphene derivatives.



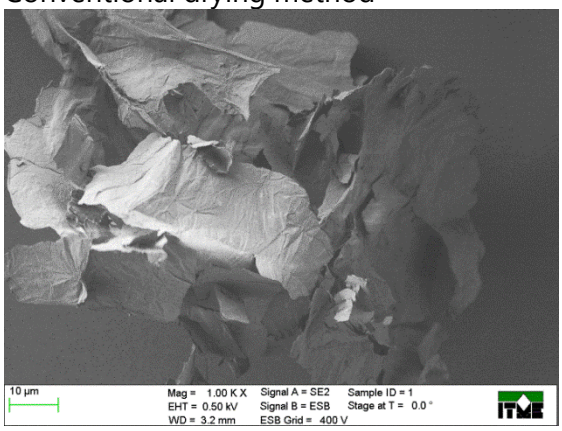
XPS

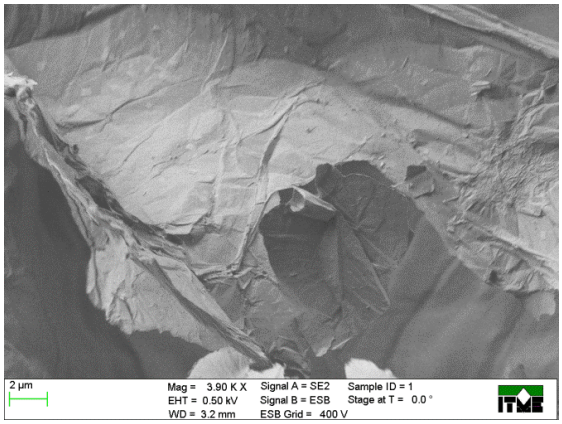


GO	Peak BE (eV)	Concentration in atomic scale (%)	Chemical bond
C1s	285	33.60	C – C and C=C
C1s	287.04	30.94	C – O (epoxy, hydroxyl groups)
C1s	288.22	4.59	C = O (carbonyl groups)
O1s	532.9	23.1	C – O

SEM

Conventional drying method





Alternative drying method