Rockleigh Industries Inc.
8 Rockleigh rd, Rockleigh, New Jersey 07647 USA
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Graphene Oxide Paste / Slurry and Graphene Oxide Liquid

Equipment used

RAMAN : BRUKER SENTERRA II -Confocal Raman Microscope
AFM : Park Systems XE 100 Atomic Force Microscope
XPS : Thermo Scientific™ ESCALAB™ Xi+ X-ray Photoelectron Spectrometer
XRD : BRUKER D8 Focus X-ray diffractometer
FTIR : BRUKER Vertex80 FTIR microscope (Hyperion)

Sample Details

Start-up Graphite : C99+ Vein Graphite, Particle size range: 63-90 µm

Product	GO Paste
Color	Brown
Odor	Odorless
Initial Moisture Content (%)	85 - 95
GO Content (g/kg)	150 - 50
pH range (at 25 ˚C)	2 - 3

Graphene Oxide Liquid:

Graphene Oxide Concentration can be customized to any percentage.

Our Liquid standard is based on 1% concentration (10g/L) paste.
If requires 2% (20g/L) concentration paste or Concentration 3.5% (35g/L), or any Percentage per customer requirements.

Dry content based pricing.

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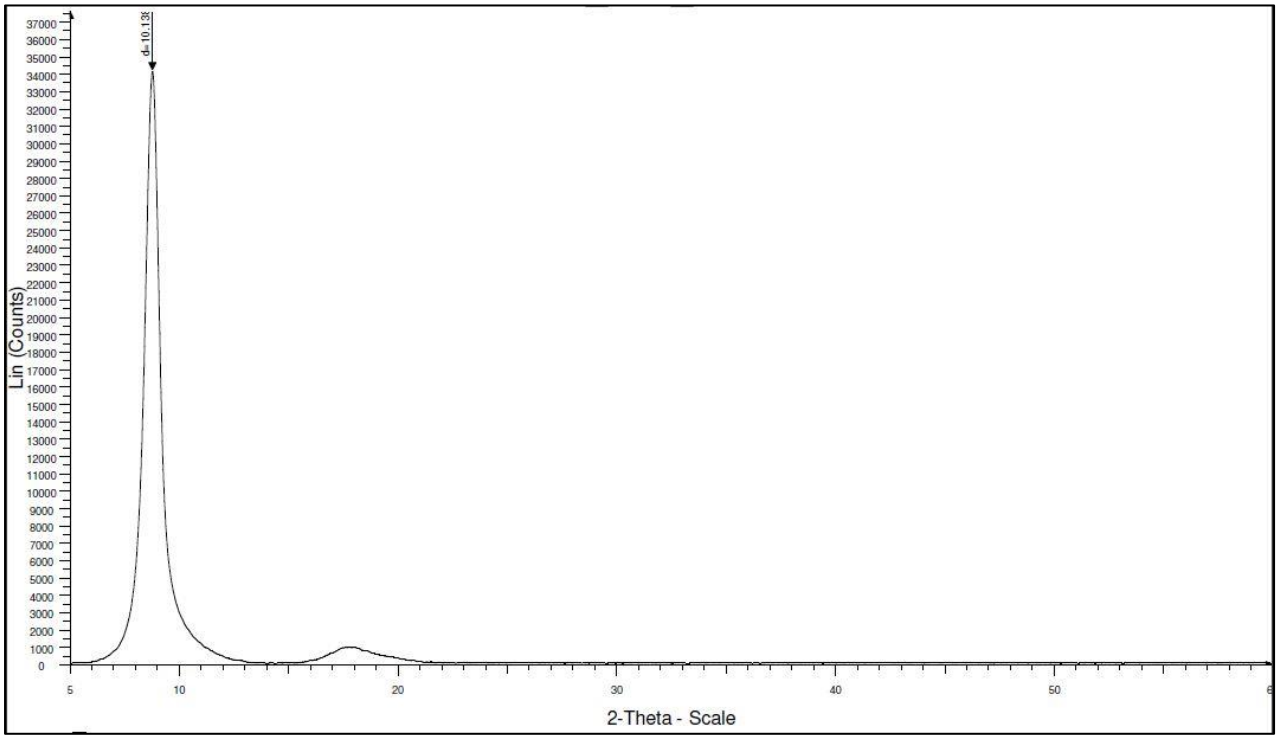
Analysis

X-ray powder diffraction (XRD)

The sample was mounted on sample holder. Parameters were set as follows, Cu Kα radiation (λ= 0.154 nm) over a 2θ range of 5−60° with a step size of 0.02° and a step time of 10 s.



d-spacing 9 - 10 Å

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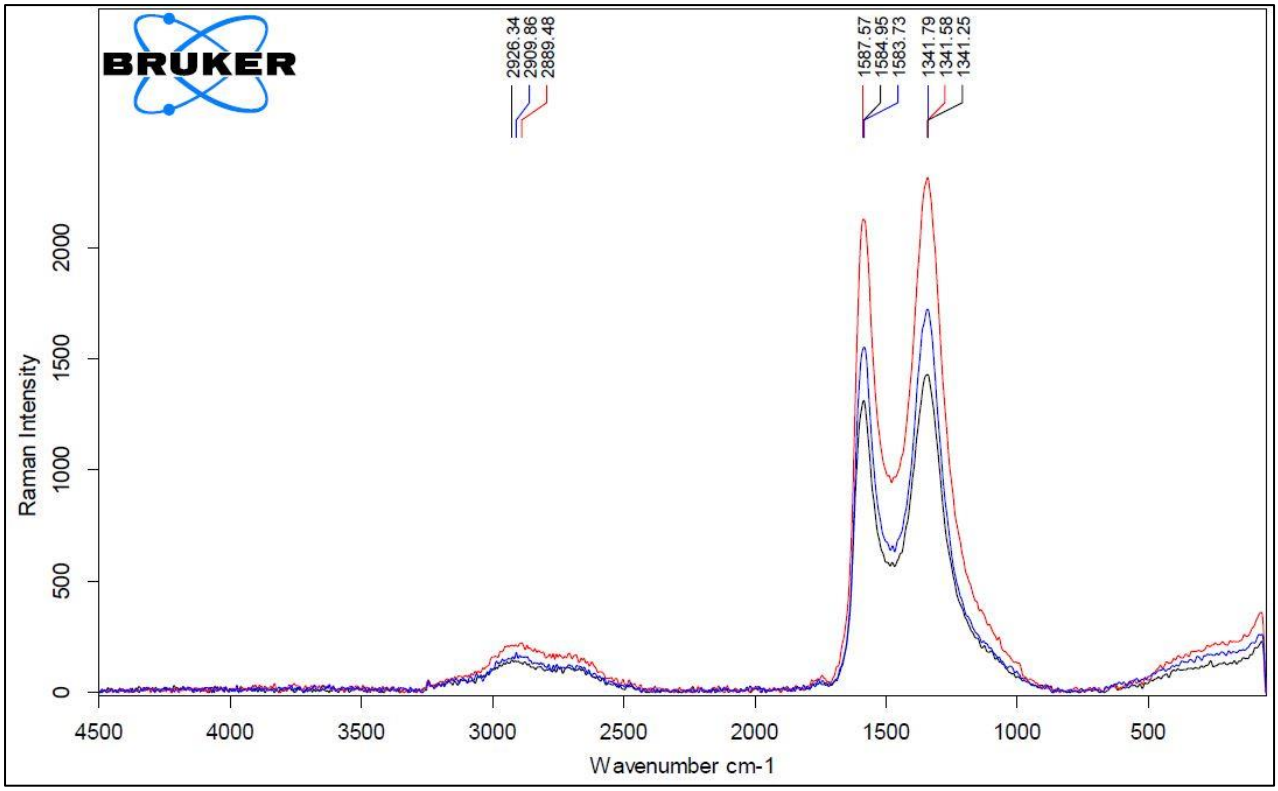
RAMAN Analysis

The sample was drop casted on SiO_2 wafers whose oxide thickness is 300 nm. Three different spots were analyzed. Parameters were set as follows, 532 nm; green laser was used with 20X optical zooming.



Average I_d/I_g ratio: 1.01 – 1.10

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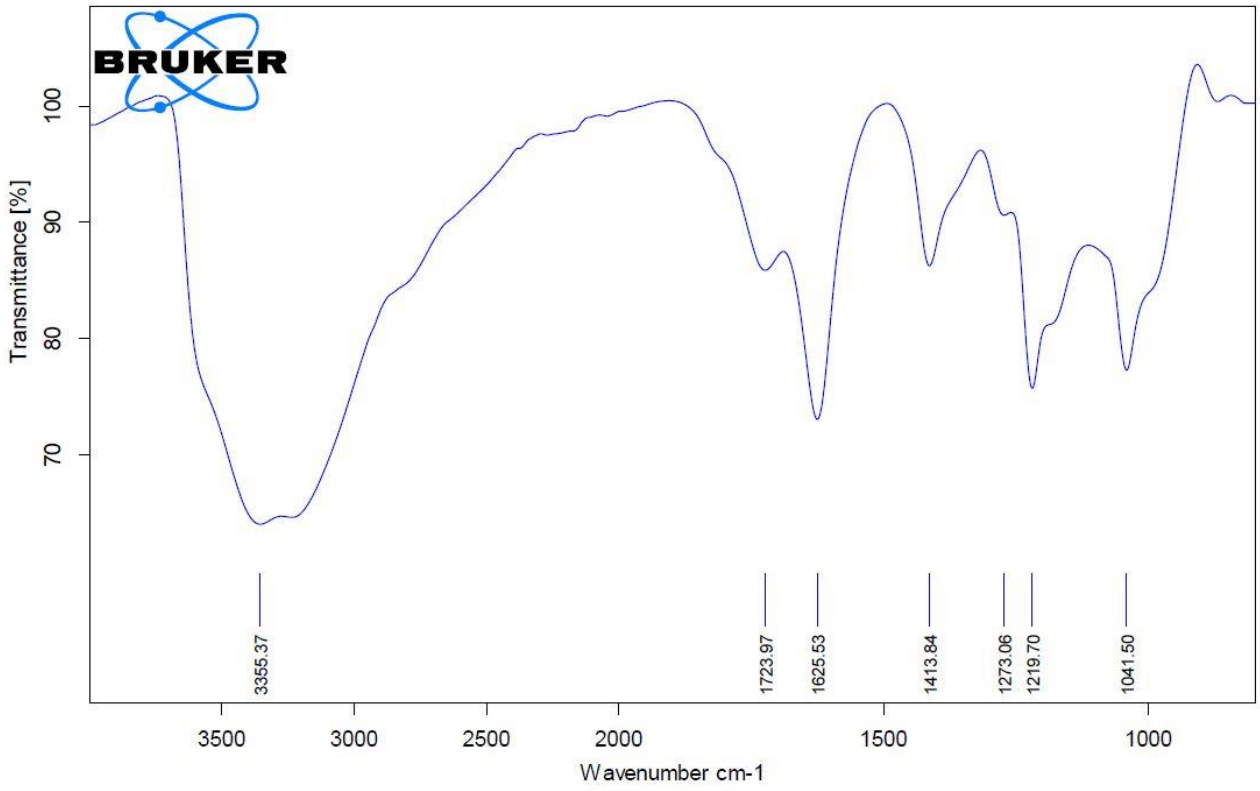
Fourier-transform infrared spectroscopy (FTIR)

Attenuated total reflection Fourier transform infrared (ATR-FTIR) spectra of the graphene oxide were recorded in the region 800 to 4000 cm^{-1} at a resolution of 4 cm^{-1}.



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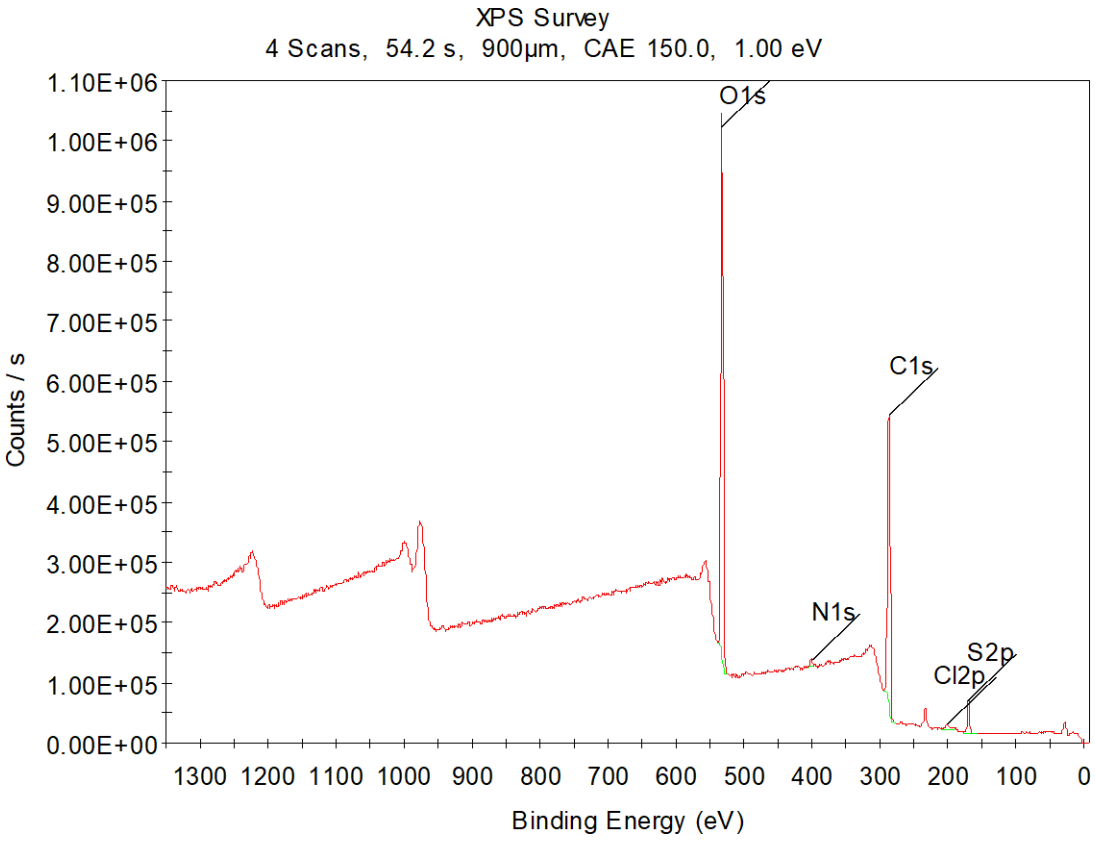
X-ray Photoelectron Spectroscopy (XPS)

The sample was mounted on a glass substrate using double tape. Three different spots per sample were analyzed. Parameters were set as follows, X-Ray source: Monochromatic Al Kα (1486.6 eV), Spot size: 900 µm. Survey scans and high-resolution scans were collected with pass energies of 150 and 20 eV and with a step size of 1.0 and 0.05 eV. Detailed spectra processing was performed by Thermo Avantage (5.982) software.

Name	Peak BE	Atomic %			Avg. %
		scan 1	scan 2	scan 3	
O1s	**531.77**	**34.12**	**34.76**	**33.73**	**34.20**
C1s	**285.1**	**62.16**	**61.27**	**62.24**	**61.89**
N1s	399.93	0.56	0.82	0.79	0.72
S2p	168.39	2.85	2.78	2.77	2.80
Cl2p	199.44	0.31	0.37	0.47	0.38

***C/O ratio: 1.80 – 2.40**



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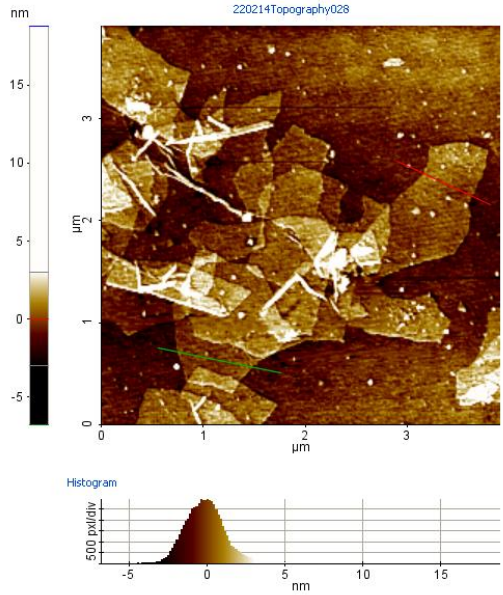
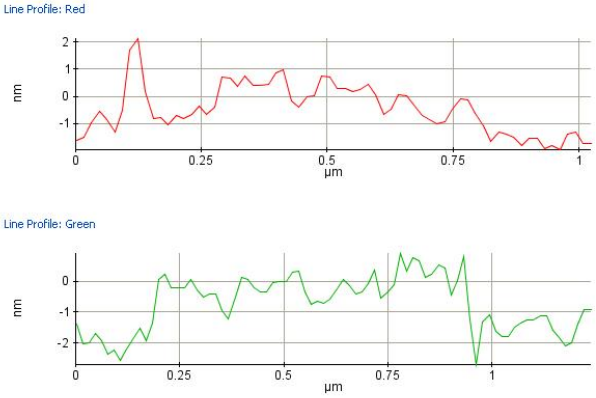
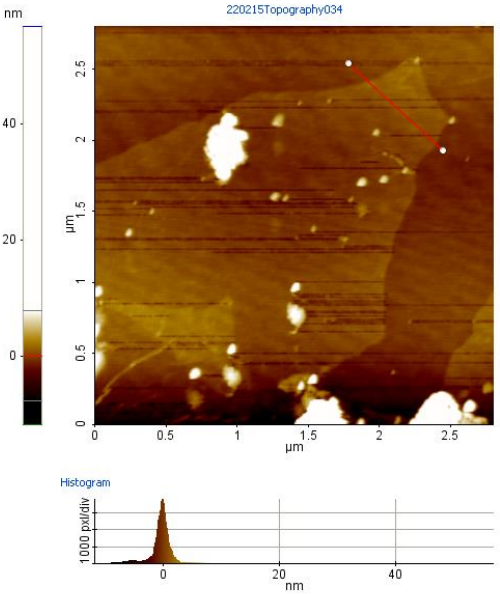
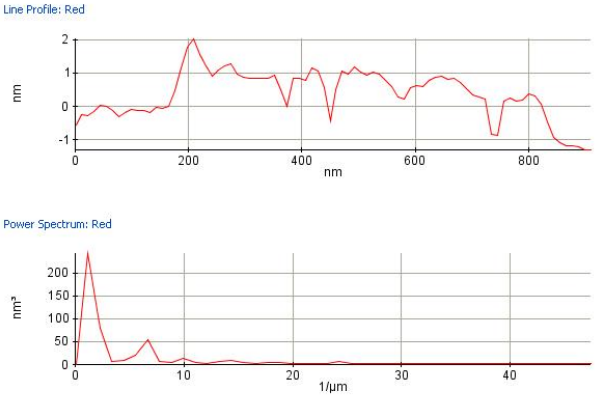
Atomic Force Microscopic (AFM) Analysis

The sample was drop casted on a 300 nm (Oxide thickness) Silicon Dioxide Wafer of dimension 1 cm × 1 cm. The concentration of the GO Dispersion prepared was 0.01 mg/ml.









Average Through Plane Dimension (Z – axis)	**= ~ 2.0 nm**
Average Lateral Dimension (X & Y axis)	**= 1 - 2 µm**