HYDROGRAPH

RGA-COOH-1 Reactive Graphene Aggregate Carboxylic Acid Type Technical Datasheet

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Product Number: RGA-COOH-1	**Product:** Reactive Graphene Aggregate Carboxylic Acid Type

Product Description

A few layer, functionalized, turbostratic graphene in a powdered form of aggregated nano-platelets from carbon-rich gas explosion synthesis

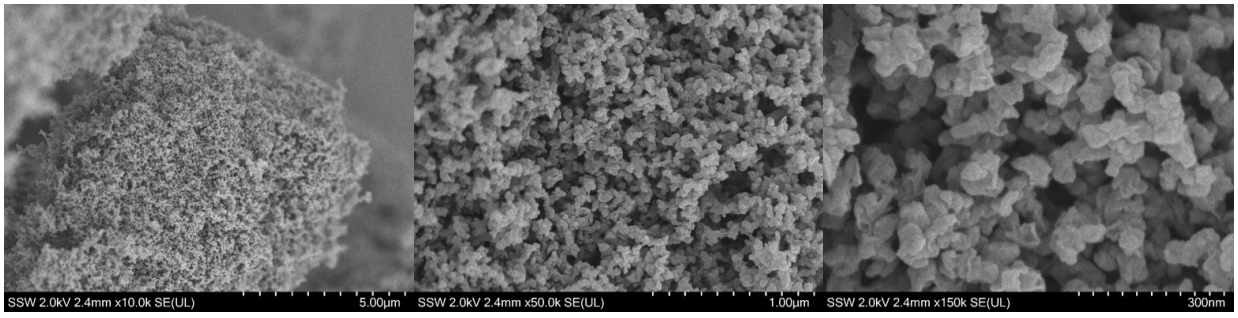
Product Information	
Production Method	Controlled Oxidation in Batch Reactor
Raw Material	Fractal Graphene Aggregate
Forms of Materials	PWD – Dry Powder

Characteristic	Test Method	Value
SP2 Bonded Carbon	RAMAN, XPS	Yes (G peak), 100% sp2 (D parameter)
Structural Defects	RAMAN	D/G = 0.66 G width = 39 cm^{-1}
Number of Layers	X-Ray Diffraction	6-layer average
Z-Axis Dimensions	X-Ray Diffraction	3 ± 0.5nm
Primary Particle Shape	TEM, Light Scattering	Platelets (aggregated)
Lateral Dimensions	TEM	20-50nm
Aspect Ratio	TEM	1:15
Tapped Bulk Density		200-270 mg/mL*
Chemical/Elemental Analysis	XPS	C 96.3%
Oxygen Content %	XPS	2.1%
Impurities %	XPS	1.6%
Functionalization	FTIR	-COOH
Surface Particle Charge	Zeta Potential	-25mV
Graphene Orientation	RAMAN, XRD	Turbostratic
Specific Surface Area (SSA)	BET	130-180 m^2/g
Crystallinity	Electron Diffraction, X-Ray Diffraction	Crystalline

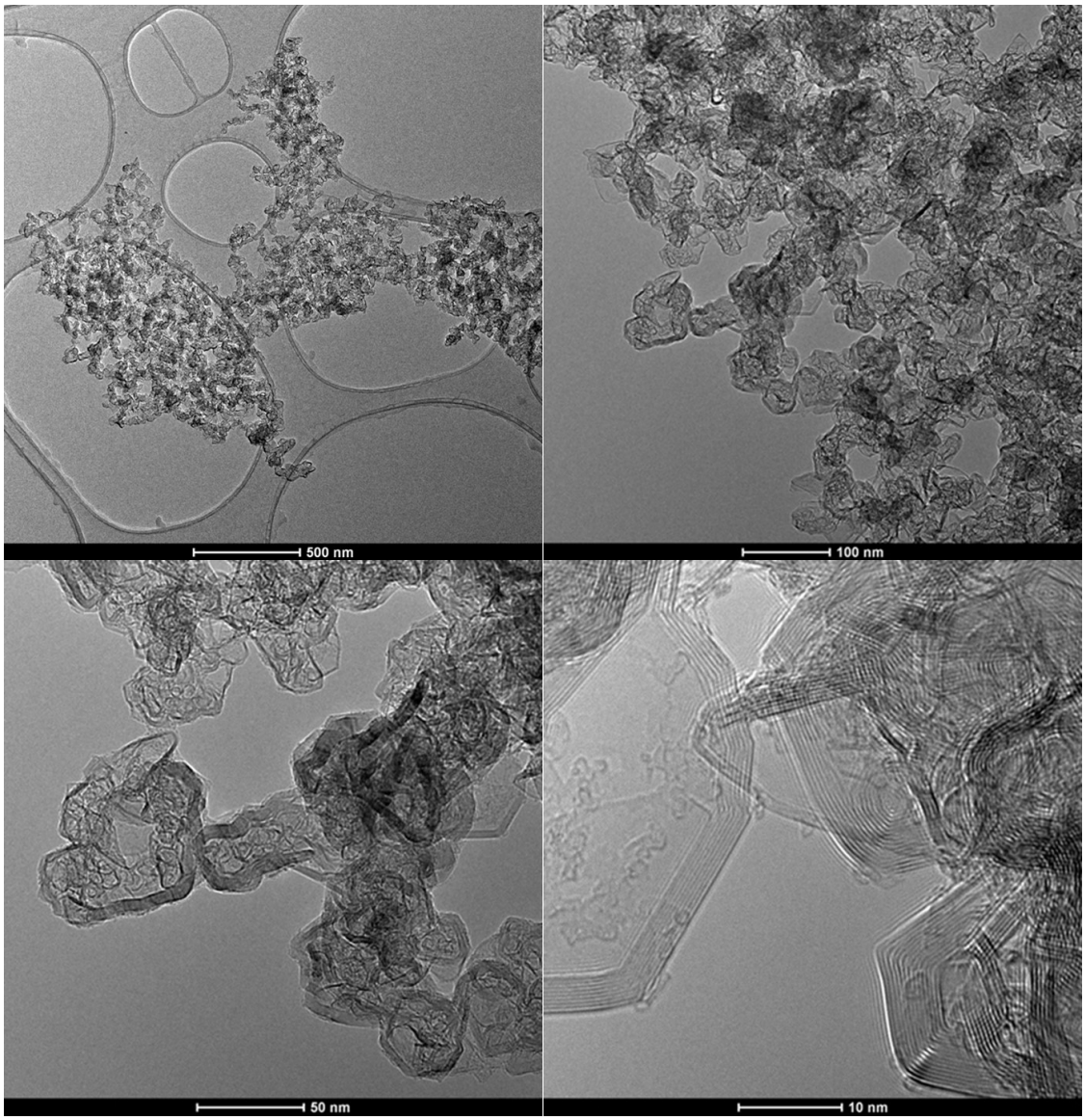
*Density may vary

Parameters	
Appearance	Black powder
Number of Layers	3-9 layers
Lateral Size	Nano-platelets 20 to 50nm. Aggregates radius of gyration ~150nm
Shape and Form	Fractal aggregate of nano-platelets
Elemental Analysis	Atomic %: 96.3% Carbon, 2.1% Oxygen, 1.6% Hydrogen, No PAHs
Dispersants/Surfactants	None
Concentration	100%
Solid Content	100%
Solvent content	N/A
Substrate Material	N/A
Sheet Resistance	Not applicable
Color	Light absorbing. Black L*=3.5, a*=-0.06, b*=-0.68 (10^0 observer/D65 Illuminant)
Odor	None
Solubility in Water	Hydrophilic
Electrical Conductivity	Function of powder compression. 100-250 S/m
Thermal Stability	Thermo-gravimetric analysis (TGA) shows: In nitrogen- No volatiles up to 600°C In air- Stable up to 439°C, Tmax=638.3°C (at dT/dt=10^0C/min)

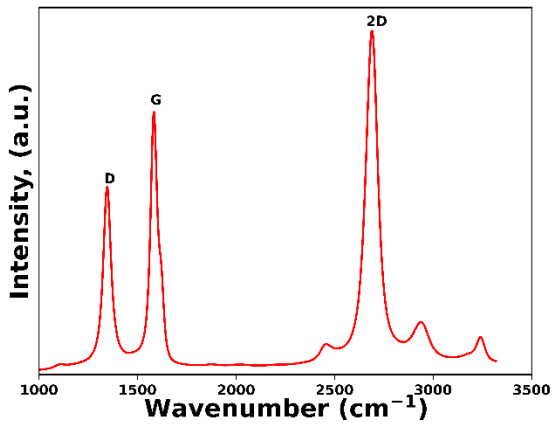
Scanning Electron Micrographs



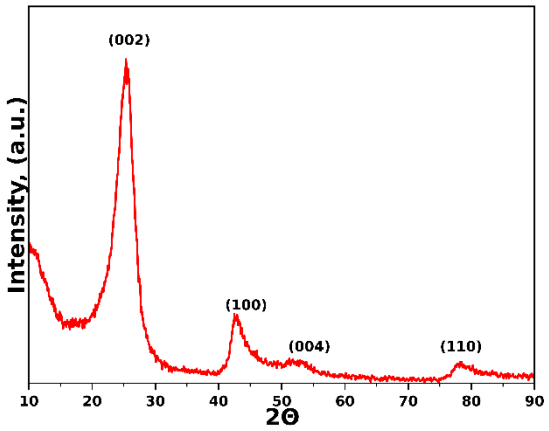
Transmission Electron Micrographs



Raman Spectrum (532 nm)



X-Ray Diffractogram



Notes on Analysis:

- The turbostratic nature is indicated by the asymmetric (100) peak in the X-Ray Diffractogram and the symmetric Lorentzian 2D peak in the Raman Spectrum.
- AFM- The aggregate nature of our fractal graphene is not amenable to AFM analysis.
- Raman- The nanoscale lateral dimensions of our monomer platelets lead to a high fraction of defect edge sites which enhance the intensity of the Raman D bands.