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FGA-1 Fractal Graphene Aggregate Technical Datasheet

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Product Number: FGA-1	**Product:** Fractal Graphene Aggregate

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

Product Information	
Production Method	Explosion Synthesis
Raw Material	Carbon Bearing Gas
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 = 0.98 G width = 50cm^{-1}
Number of Layers	RAMAN, X-Ray Diffraction	6-layer average
Z-Axis Dimensions	RAMAN, X-Ray Diffraction, AFM	2-3nm
Primary Particle Shape	TEM, Light Scattering	Platelets (aggregated)
Lateral Dimensions	TEM	20-50nm
Aspect Ratio	TEM	1:15
Tapped Bulk Density		70-100mg/mL*
Chemical/Elemental Analysis	Chemical Analysis	C 99.8%
Oxygen Content %	Chemical Analysis	0.05%
Impurities %	Chemical Analysis	0.1%
Functionalization	Chemical Analysis	Not Detected
Surface Particle Charge	Zeta Potential	+60mV
Graphene Orientation	RAMAN, XRD	Turbostratic
Specific surface Area (SSA)	BET	200m^2/g
Crystallinity	Electron Diffraction, X-Ray Diffraction	100%

*Density may vary

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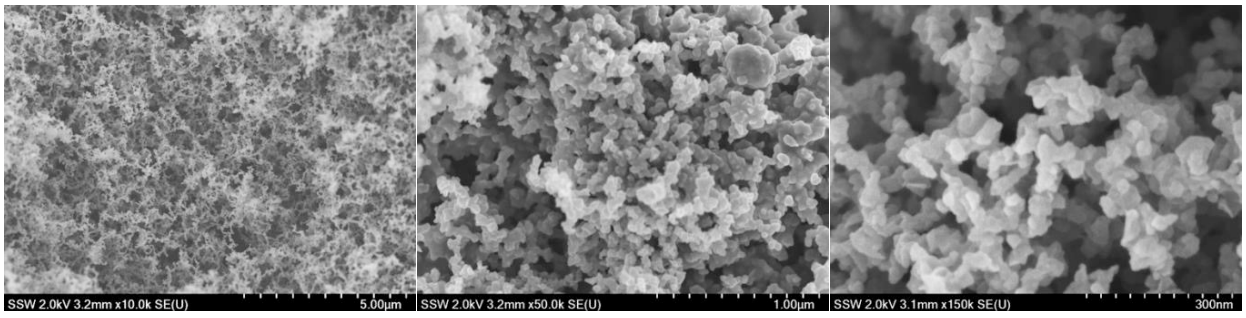
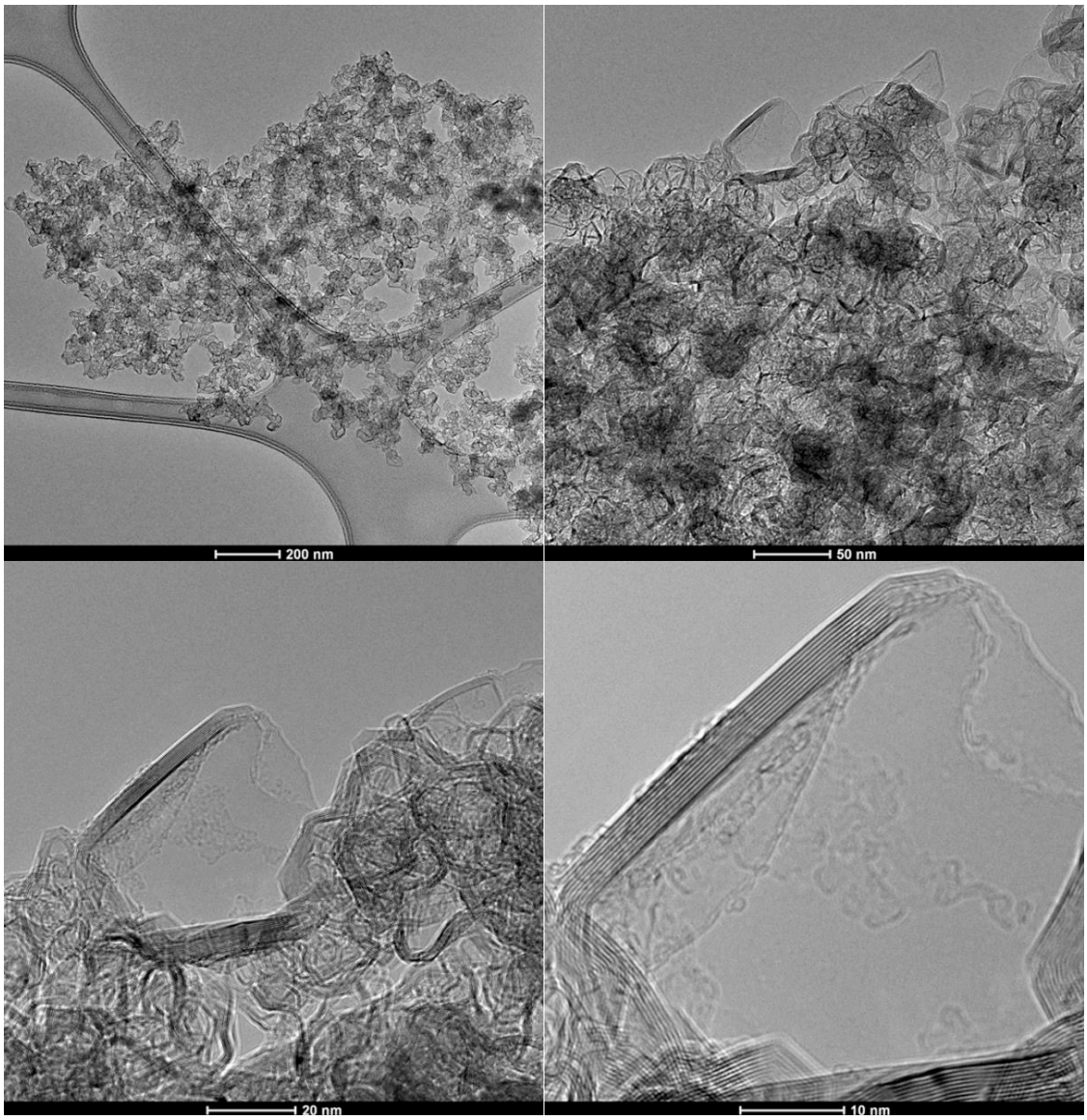
Parameters	
Appearance	Black fluffy powder
Number of Layers	3-9 layers
Lateral Size	Nano-platelets 20 to 50nm. Aggregates radius of gyration ~150nm
Shape and Form	Fractal aggregate of nano-platelets
Elemental Analysis	Atomic %: 99.8% Carbon, 0.05% Oxygen, 0.15% Hydrogen, No PAHs
Dispersants/Surfactants	None
Concentration	100%
Solid Content	100%
Solvent content	N/A
Substrate Material	N/A
Sheet Resistance	Not applicable
Color	Light absorbing. Black L*=2.6, a*=-0.12, b*=-0.79 (10^0 observer/D65 Illuminant)
Odor	None
Solubility in Water	Hydrophobic
Electrical Conductivity	Function of powder compression. 100-500Sm^{-1}
Thermal Stability	Thermo-gravimetric analysis (TGA) shows: In nitrogen - No volatiles up to 600°C In air - Stable up to 544°C, Tmax=725.5°C (at dT/dt=10^0C/min)

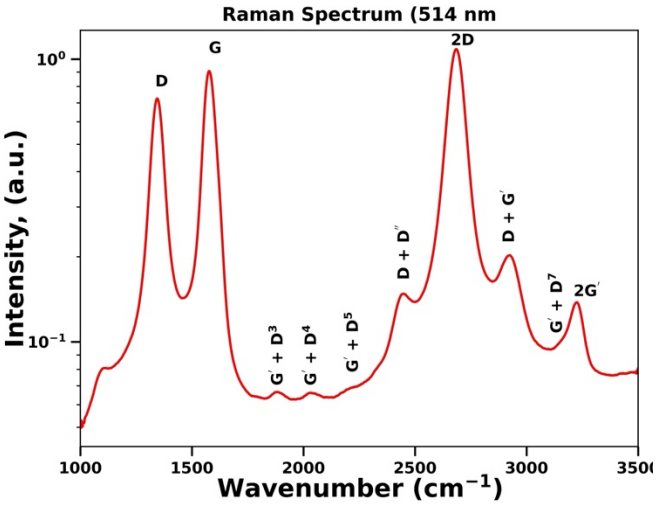
Scanning Electron Micrographs



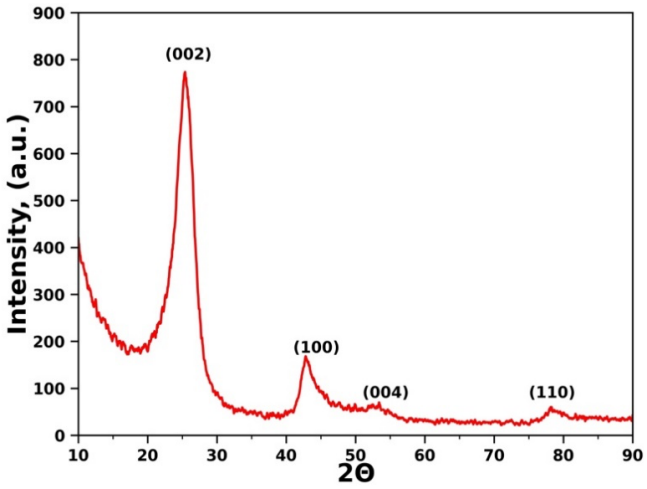
Transmission Electron Micrographs



Raman Spectrum (514 nm)



X-Ray Diffractogram



Notes on Analysis:

- The turbostratic nature is indicated by peaks at position 1885cm^{-1} and 2035cm^{-1} in the Raman spectrum and the asymmetric (100) peak in the X-Ray Diffractogram.
- AFM - The aggregate nature of our fractal graphene is not amenable to AFM analysis.
- Raman - The nanoscale lateral dimensions of our monomer platelets leads to a high fraction of defect edge sites which enhance the intensity of the Raman D bands.