Graphene Products and Suggested Applications

Graphene[1] is an extremely promising material due to its extraordinary mechanical, electronic, magnetic and optical properties which are anticipated to impact semiconductor and composite industries for a variety of applications such as transparent conductive layers for solar cells, transparent electrodes, coatings, sensors and advanced composite materials for high strength and high thermal resistance.

Graphite Oxide is a widely used precursor for economical bulk synthesis of chemically-derived-graphene (CDG). CDG is most often prepared from graphene oxide (GO) and reduced either chemically, thermally or both.

Graphite oxide can be converted into single layer graphene oxide (GO) in polar solutions due to the presence of oxygen functional groups creating an electronegative repulsion. However, improving the oxidation of graphite improves the exfoliation into single layers but can do so at the expense of the sp^2 hybridized structure of carbon atoms on their basal surfaces.

Table 1. 1st Graphene Products and Suggested Applications

Product	Description	Applications
UP	Ultra Pure Graphene Oxide	Functional Materials, Gas Barriers, Solutions based coatings, Single Layer Device fabrications,
UL	Ultra Large	High Strength Functional Materials, Gas Barriers, Mechanical Barriers, Solutions based coatings
Upr	Ultra Pure Reduced	Device Fabrications, Organic Solar cells, Thermal Management
ULr	Ultra Large Reduced Graphene Oxide	High Strength Functional Materials, Gas Barriers, Mechanical Barriers, Solutions based coatings, Advanced Thermal Management

Table 2. 1st Graphene Product Specifications

Product	Interlayer spacing (nm)	xy-axis (μm)	"N (layers) Average"	O% / C%	Shelf life
UP	1.58	3.65	< 2	40.3 / 59.7	6 mo.
UL	1.44	13.9	< 4	31.9 / 68.1	6 mo.
Upr	0.62	0.3	1	0.01 / 99.99	2 yr.
ULr	0.59	3.3	< 4	96.7 / 3.3	2 yr.

Not all graphenes are created equal.

1st Graphene supplies multiple different types of Graphene Oxide material and reduced Graphene Oxide for customized solutions at optimized prices.

Table 1. Gives some idea of what applications might be best suited for each product.

Table 2. summarizes 1st Graphene product specifications using X-ray Diffraction (XRD) analysis to determine the interlayer spacing, the average length (xy axis) of the crystalline axis and the average number of layers. Atomic Force Microscope is used to verify XRD measurements.

[1] A.K. Geim, K.S. Novoselov, The rise of graphene, Nat. Mater. 6 (2007) 183–191. doi:10.1038/nmat1849

[2] https://doi.org/10.1016/j.mseb.2017.07.018

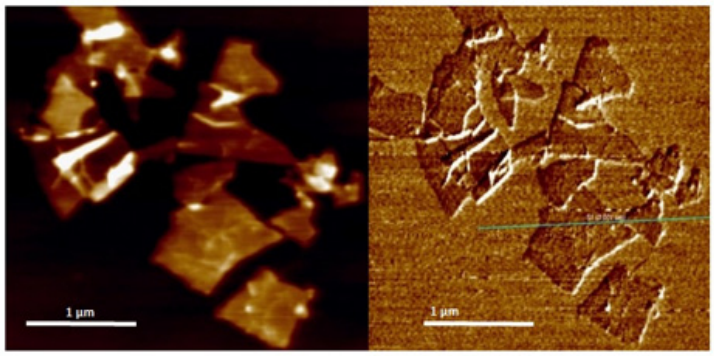

Fig 1.

Atomic Force Mircroscope height and phase images Ultra Pure Graphene Oxide [UP]

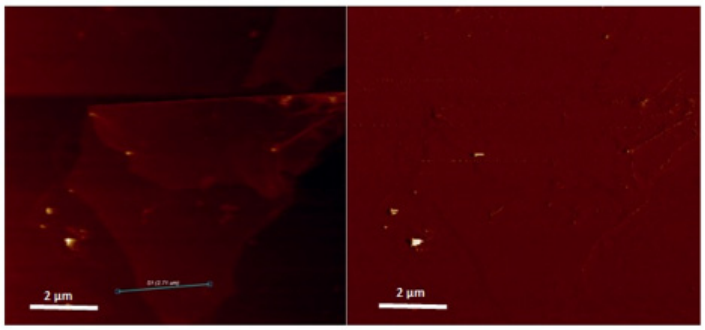

Fig 2.

Atomic Force Mircroscope height and phase images Ultra Large reduced Graphene Oxide [ULr]

sales@1stgraphene.com
www.1stgraphene.com
888 836-1111

1ST GRAPHENE MAKING EVERYTHING BETTER