Patented green mass production of Graphene Oxide using advanced oxidation.

Single to few layer exfoliations; batch yield 97 percent 1-3 layers.

- By using an advanced oxidation method, we add functional oxygen groups to the graphene sheet without the use of nasty chemicals, acids or toxins.
- The traditional way to oxidize and functionalize graphene is by the Hummers' method.
- The Hummers' method uses toxic chemicals to achieve functionality.
- The Hummers' method is a high-cost low yield method which also damages the sheets; such that the sheets lose conductivity.
- By using our green advanced oxidation method, we can functionalize the graphene sheets to make them water loving, while the sheets retain conductivity of pristine graphene; best of both worlds.
- Conductivity remains because there are no visible defects or wrinkles in the sheets after the process.
- We retain all the n-pie functionalities of graphene oxide by the Hummers' method without the pie to pie transition of traditional graphene oxide.
- The reason graphene has not changed the world yet is because it is just not functional/usable; we changed that.

- Our new process allows the graphene to be sprayed, printed or filtered down on substrates to create membranes, printed circuits and 3D structures.
- It also allows us to easily mix it within paints, epoxies, polymers, concrete and foams.
- Because of this new process of advanced oxidation, it also allows us to easily create bioengineered 3D hydrogel scaffolds for drug delivery and for wound regeneration.
- The most important aspect of our graphene technology is the functional groups and the layer-by-layer construction of desired structures while retaining pristine graphene sheet conductivity.

- The functional groups attached to our graphene sheets allows for efficient superionic proton conductance by the Grotthuss mechanism; proton jumping.

- There is no better possible proton exchange membrane than graphene oxide; bar none.

- Our bulk 2D functional graphene coating is ideal to coat ceramic proton exchange membranes that Solid State Batteries use.

- Our bulk 2D functional coating will eliminate dendritic shorting of the battery.

- Our bulk 2D functional graphene coating is well suited for this role due to its functionality, lithium-ion selectivity, close channels, capillary forces (lithophilic), and extremely good adherence to ceramic substrates.

- The problem is the grain boundaries in ceramic proton exchange membranes accumulate electrons.

- This leads to dendritic growth that shorts the battery out.

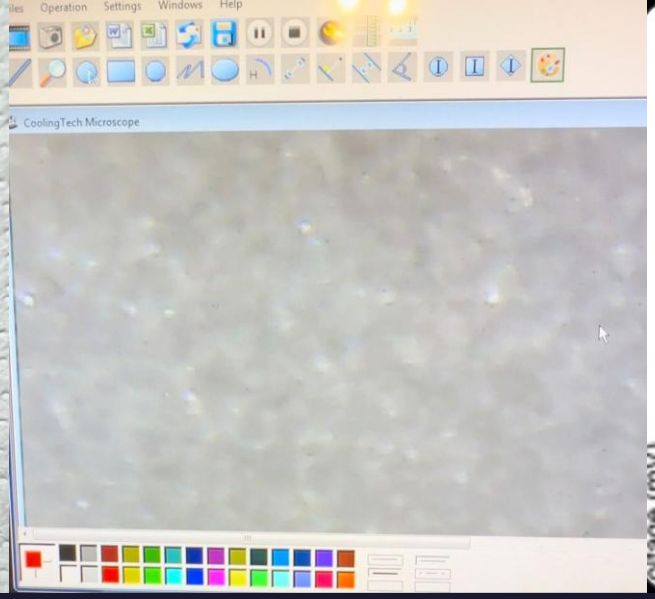
- This happens because the plating and the stripping of lithium or sodium liquid metal on the ceramic substrate is not uniform.

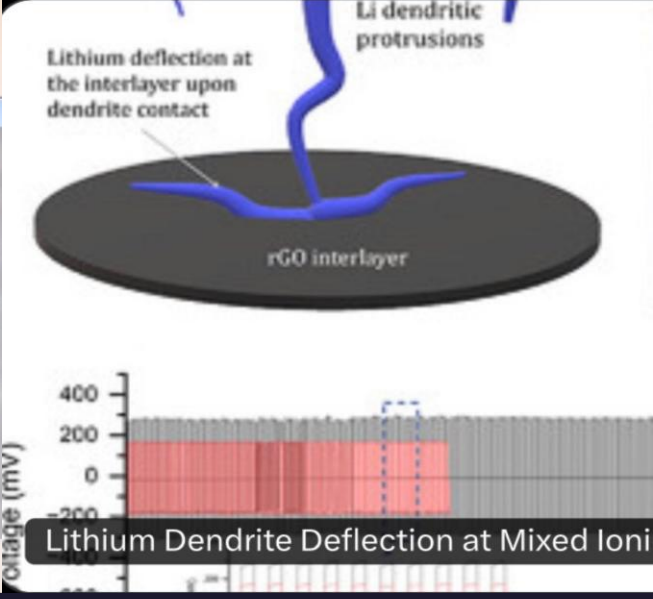
- Our bulk 2D functional graphene coating solves this problem by allowing for the uniform plating and stripping of lithium or sodium liquid metal across the ceramic proton exchange membrane.

- Our bulk 2D functional graphene coating also promises uniform pressure across the ceramic proton exchange membrane which will eliminate large pressure differentials that lead to cracking and failure of the ceramic membrane.

- Both the dendrite shorting issue and non uniform pressure differentials across the ceramic proton exchange membrane; which leads to cracking and failure of the ceramic membrane will be solved by the mass manufacturing of functionalized graphene.

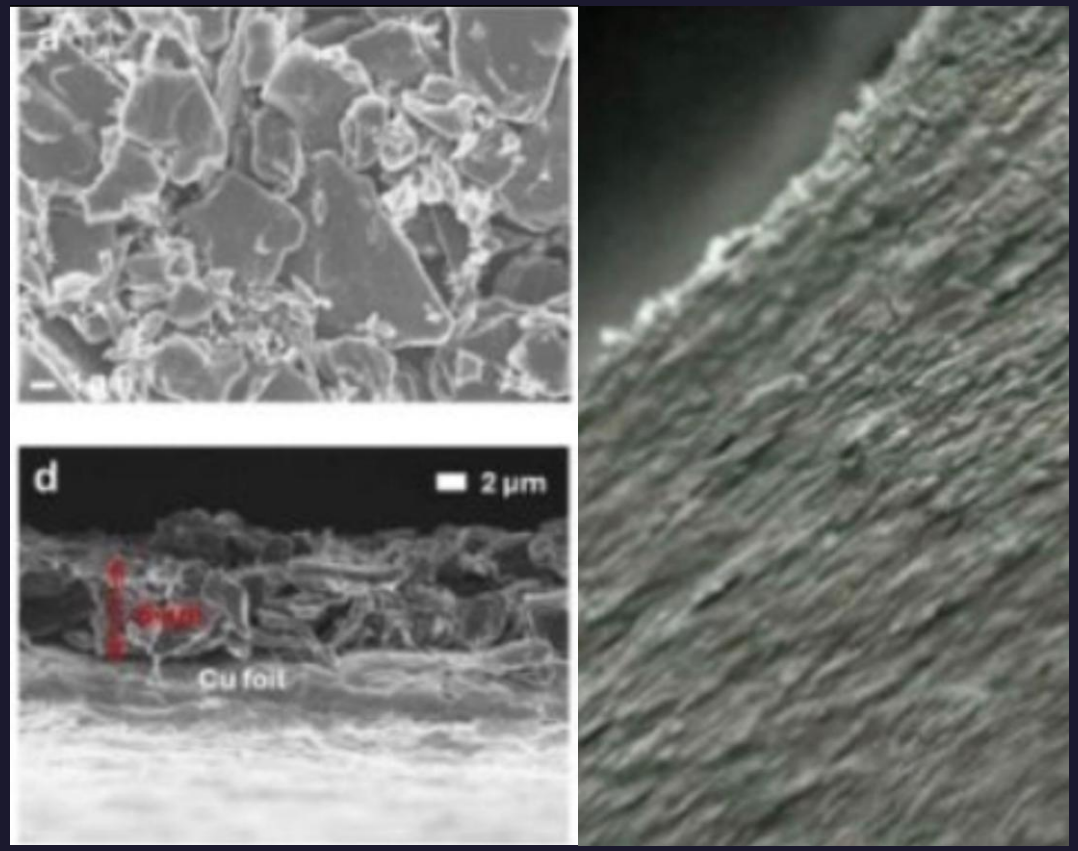
- Our bulk 2D functional graphene coating technology promises to solve the hard problem for Solid State Batteries because our technology promises uniform plating and stripping of lithium or sodium liquid metal on and off evenly across the ceramic proton exchange substrate.





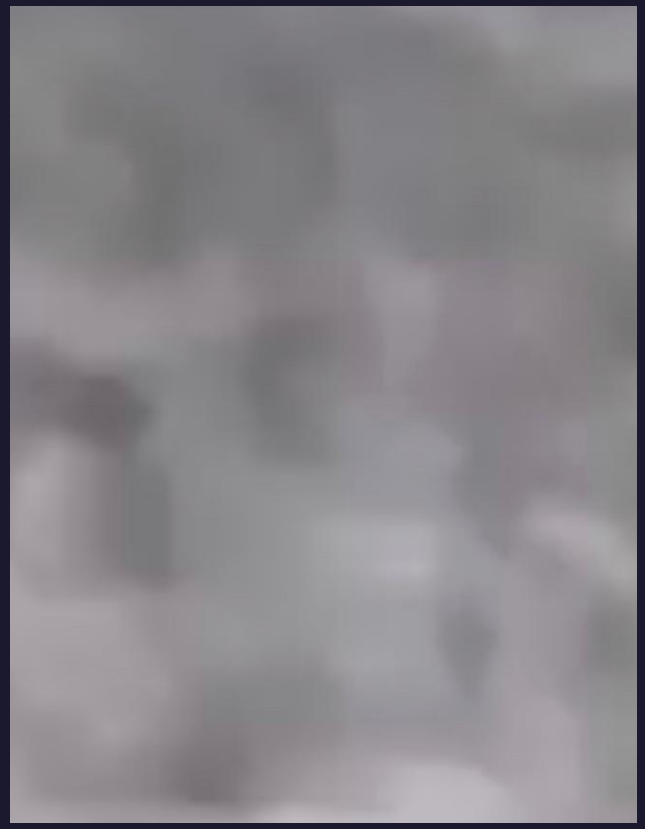
- AL2O3 carminic disc that was dip coated once within our functional graphene slurry; then it was allowed to dry.
- Natural flake graphite was used for the exfoliation; due to greater polar forces across a larger surface area, 97% yield achieved at few layers or below.
- Self assembly of functional graphene onto the ceramic substrate; traditional slot die coating techniques can be used to coat PEM membranes at scale.
- Adhesion is excellent; will not experience delamination.
- Ideal lithophilic functional coating for ceramic proton exchange membranes; will eliminate dendrite shorting.
- Would also eliminate the NMC cathode material; fast charging is now possible under 5 min or less.
- 1.2-ohm resistance of the conductive coating ;does not need to be reduced like traditional graphene oxide to achieve conductivity.

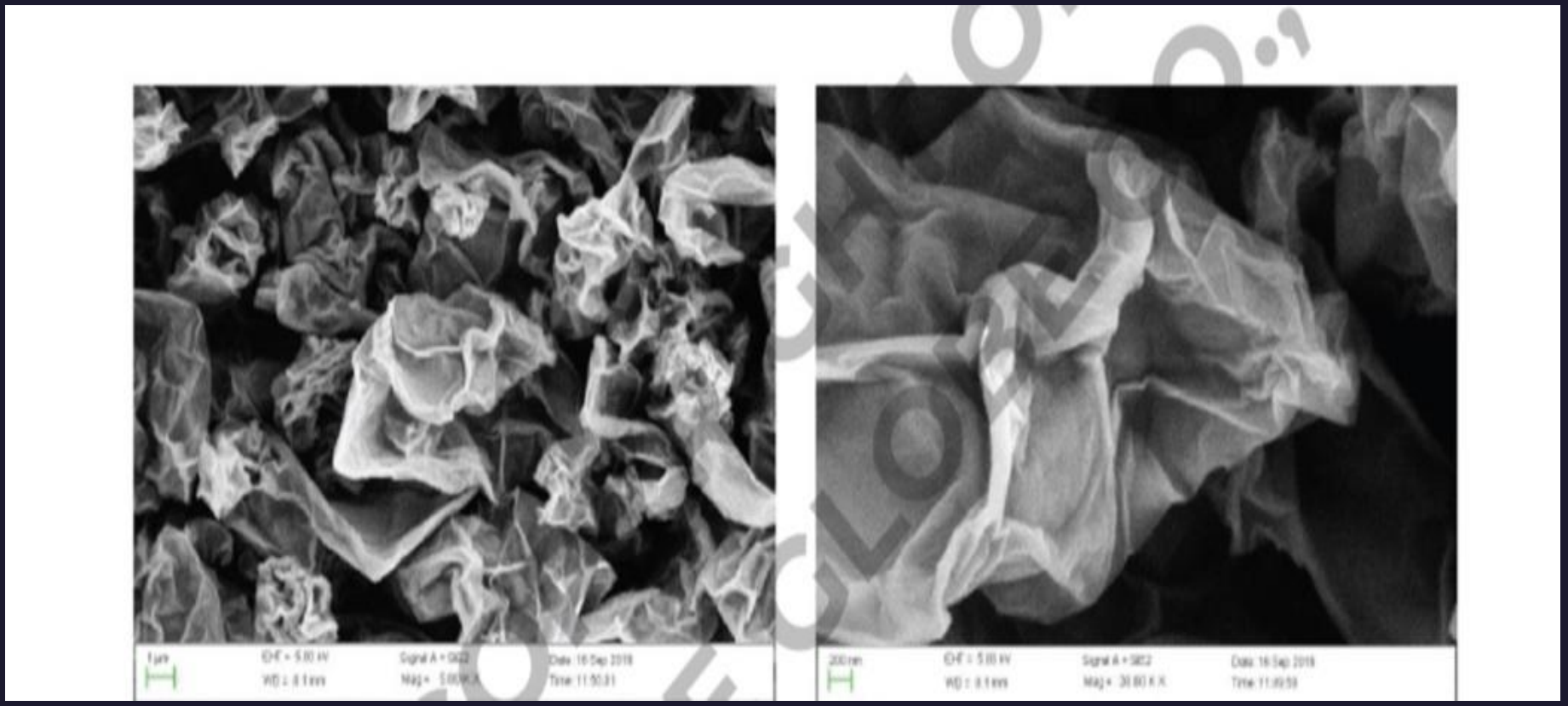
The most important aspect of our graphene technology is the n-pie functional groups and the layer-by-layer construction of desired structures while retaining pristine graphene sheet conductivity.



- First picture is how unexfoliated hydrophobic graphite lays down on an electrode.
- Vs our layer-by-layer construction of our functional graphene membranes.

Difference between our pristine undamaged conductive graphene oxide sheets on the left vs wrinkled non-conductive sheets of graphene oxide by Hummers' method on the right.





Battery grade purified natural flake graphite that we are using for our exfoliation process.

SUPERIOR GRAPHITE

INNOVATING SINCE 1917

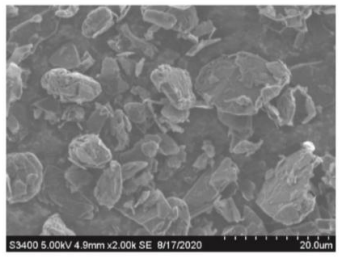
2939

Product Type

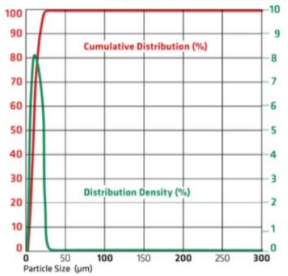
2939 is a purified flake product manufactured using Superior Graphite's proprietary electro-thermal purification technology. This continuous high-temperature process exposes the flake graphite to extremely high temperatures so that impurities, including inorganic contaminants, are sublimed. 2939 is fine size, relatively denser than the equivalent APH grade of the 'Thermally Purified Flake' product line produced using Superior Graphite's dedicated milling and screening technology. Main uses are increase in thermal & electrical conductivity, coatings, Coefficient of Friction reduction, wear reduction in high demanding applications.

Product Characteristics

- High Purity
- High Crystallinity
- Defined Texture
- Well-Defined Particle Size Distribution



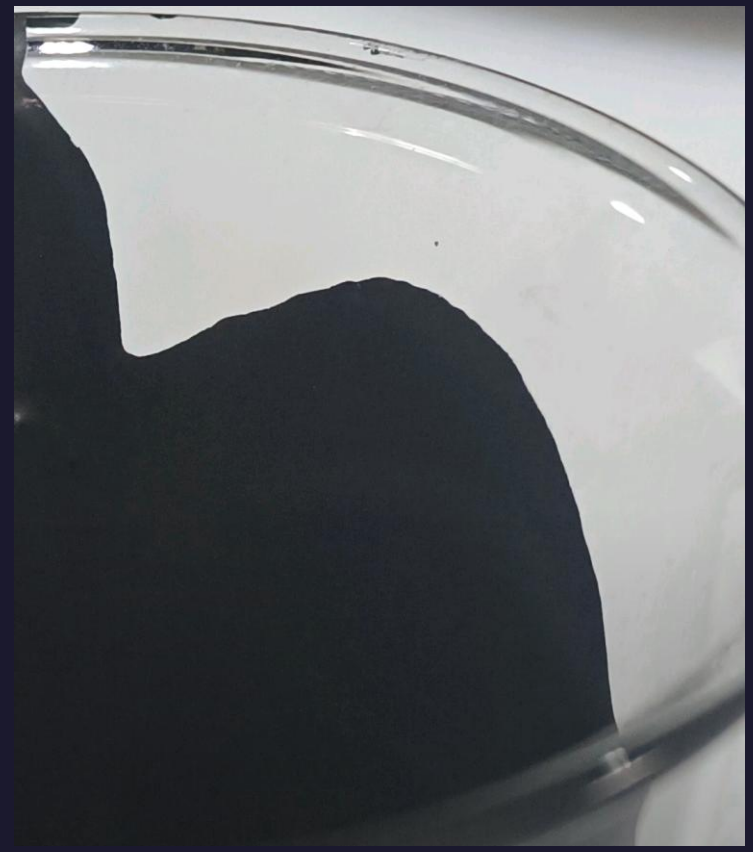
2939 Particle Size Distribution



Main Properties	
Carbon	>99.9%
Ash	<0.1%
Moisture	<0.5%
Size	D50=5-10 µm
Scott Volume	0.07-0.11 g/cc
Fe	<150 ppm

General Information	
Formula	Natural Graphite
Chemical Name	Purified Graphite Powder
CASNr	7782-42-5
RoHS	Certified
REACH	Exempted

Standard Packaging	
25 lbs bags	50 bags/pallet



Bio Oxidative Solutions LLC
Located at 3305 Butler Ave South Chicago Height's IL 6011.

1-630-310-2494