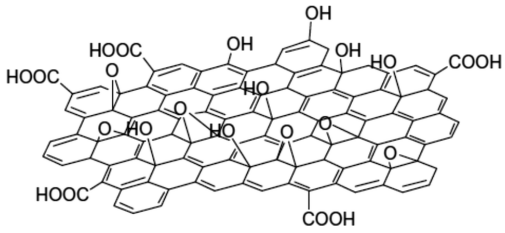
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Technical Data Sheet

Graphene Oxide (GO)

Properties

Form	Dispersion of graphene oxide sheets
Particle size	D90 **50 - 80 micron**
	D50 **50 - 20 micron**
	D10 **< 20 micron**
Color	Yellow-brown
Odor	Odorless
Dispersibility	Polar solvents
Solvents	Water
Concentration	**0.25 - 4 mg/ml**
pH	**2 - 6**
Monolayer content (measured in 0.5mg/mL)	>45%*

(*) The Graphene oxide dispersion requires proper sonication before use.

Elemental Analysis*

Carbon	49-56%
Hydrogen	0-1%
Nitrogen	0-1%
Sulfur	2-4%
Oxygen	41-50%

* Sample preparation: 2g of 4wt% GO in water were dried under vacuum at 60°C overnight.

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Innovation
Integration
Application

Graphene Oxide: (GO)

Introduction:

Graphene oxide (GO) is a single-atomic-layered material derived from graphite, rich in oxygen-containing groups such as hydroxyl, epoxy, and carboxyl. These functional groups make GO hydrophilic and chemically versatile, enabling a wide range of applications.

Properties:

- **Layer Thickness:** 1–3 nm
- **Oxygen Content:** ~25–30%
- **Solubility:** Dispersible in water and polar solvents
- **Electrical Conductivity:** Reduced compared to graphene, but recoverable via reduction to rGO

Characterization Techniques:

To evaluate the structure and quality of graphene oxide (GO), several key characterization techniques are employed. X-ray Diffraction (XRD) determines the interlayer spacing and crystallinity of GO. The presence of oxygen-containing functional groups increases the spacing between layers, typically resulting in a characteristic diffraction peak around 10–12°, which distinguishes GO from pristine graphite.

Raman Spectroscopy provides insight into the structural disorder of GO by analyzing the D and G bands. The D band corresponds to defects and disorder, while the G band relates to the in-plane vibration of sp^2 carbon atoms. The intensity ratio of these bands (I_D/I_G) serves as a crucial indicator of the degree of oxidation and defect density in the material.

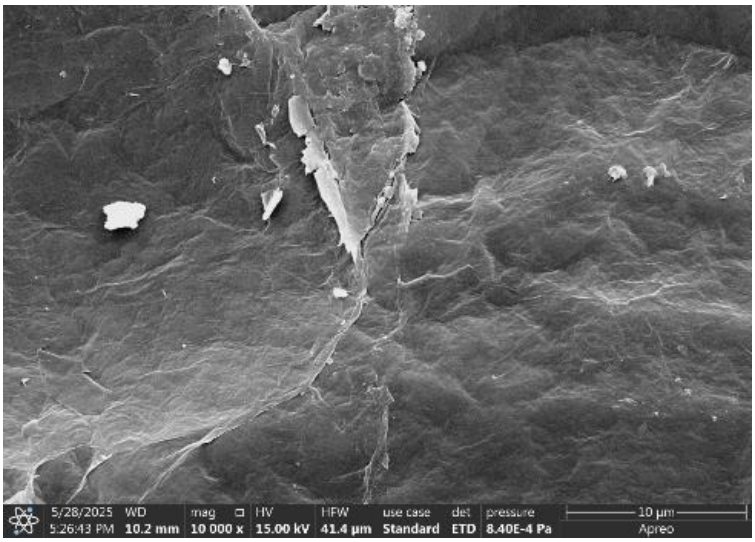


Figure: Scanning Electron Microscopy (SEM) of NM-GO

Scanning Electron Microscopy (SEM) visualizes the surface morphology and layer structure of GO sheets. SEM images reveal the wrinkled, sheet-like appearance of GO and help assess the uniformity and stacking of layers. In EDS, - High oxygen content is evident, with a typical C/O atomic ratio around 2:1 to 3:1, depending on synthesis conditions. Peaks for carbon (C) and oxygen (O) dominate the spectrum. Together, these techniques offer a comprehensive understanding of GO's physical and chemical characteristics, essential for tailoring it to specific applications.

Applications:

- **Energy:** Super capacitors, batteries
- **Water Treatment:** Membranes for filtration
- **Biomedicine:** Drug delivery, biosensors
- **Composites:** Reinforcement in polymers
- **Electronics:** Flexible and transparent conductors

Conclusion:

Graphene oxide's unique structure and tunable chemistry make it a standout material in nanotechnology. Characterization techniques are essential for tailoring GO to specific applications and ensuring reproducibility in research and industry.