Graf-X™ Graphene Nanoplatelet Additives

TECHNICAL DATA SHEET 615

Graphene Nanoplatelet Additives

The Graf-X™ graphene nanoplatelets are bulk powder additives specially designed to enhance product performance in markets and applications including:

- Building and Construction - Concrete Admixtures, Foams, Insulation, Resins
- Composites and Textiles - Thermoplastics, polymer films, thermosets, conductive yarns
- Coatings, Adhesives, Sealants and Elastomers (CASE) - Waxes, liquid/powder coatings, additive manufacturing consumables
- Energy Storage - Batteries

Graf-X graphene nanoplatelets can enhance:

- Mechanical strength
- Electrical conductivity
- Thermal properties
- Barrier properties

Available grades are summarized below and vary according to the particle sizing, purity, and surface area. Customized particle sizing, purity, and surface area are available upon request.

Typical Properties[*]

CHARACTERISTIC	UNIT	Graf-X™ GNP-1000	Graf-X™ GNP-2000	Graf-X™ GNP-3000
Specific Surface Area (1)	m^2/g	15-20	30-40	11-17
Purity (Carbon Content) (2)	%	99+, <99>97, <97>92, <92	<97>92	99+, <99>97
Average Lateral Dimension (3)	µm	10, 20, 40		5, 10, 20, 50
Scott Density (4)	g/cm^3	0.05-0.09		0.08-0.2
Oxygen Content (5)	%	0.2-0.3		0.9-3.3
Number of Graphene Layers (6)		<200	<100	<10

The Product Naming Convention Example: GNP-1000-20-C:

| **GNP**	—	**1000**	—	**20**	—	**C**
Graphene Nanoplatelets		Series		20µm Lateral Dimension		95%+ purity

The Graf-X™ graphene nanoplatelets are available as dry powders. Samples are typically provided in the range of 50g-1kg with the Graf-X™ - GNP-1000 and GNP-2000 grades available in metric ton (MT) quantities. NeoGraf Solutions application \ engineers are available to discuss appropriate grade selections and loading levels for each application. Grades may be available as dispersions and masterbatches upon request.

(1) BET method

(2) Per loss on ignition (LOI)

(3) D50 via laser diffraction particle size analysis

(4) Scott Density based on ASTM B 329-98

(5) Oxygen content measured using combustion analysis

(6) The number of graphene layers are estimated from a ratio of the measured BET specific surface area to the theoretical specific surface area of single crystal graphene (2630 m2/g) for the GNP-1000 and GNP-2000 materials and from Raman spectroscopy for the GNP-3000 series.
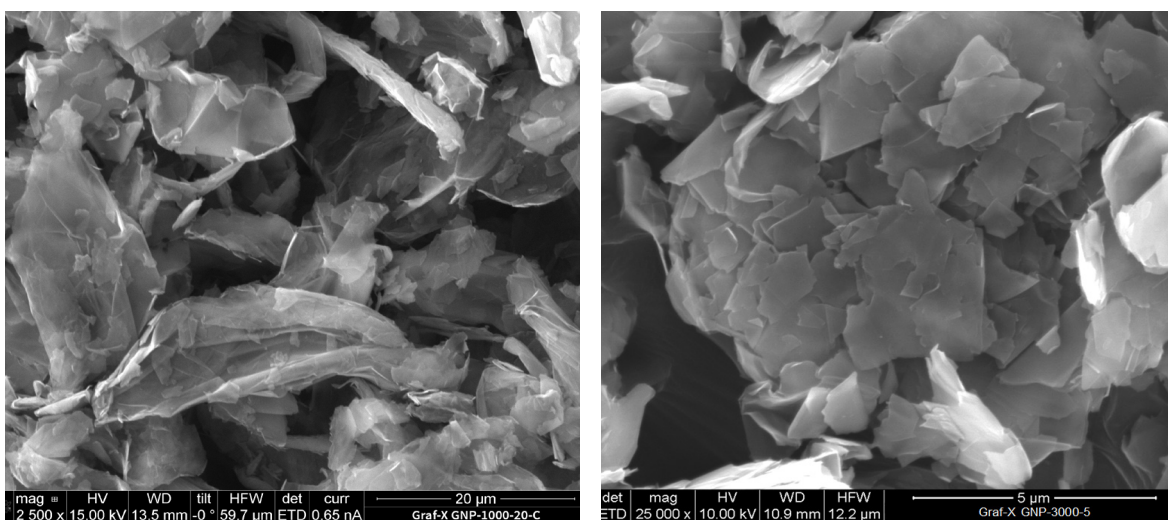
SEM Images of Graphene Nanoplatelets
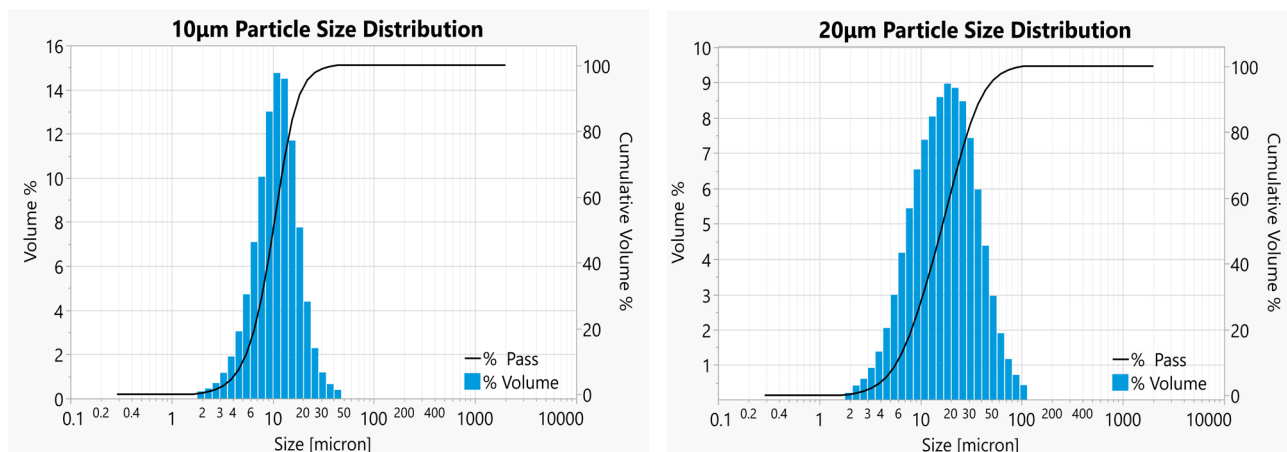
Typical Particle Size Distribution for 10µm and 20µm Graphene Nanoplatelet Additives

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