



HYDROGRAPH

IGNITING MATERIAL CHANGE

FRACTAL GRAPHENE™ IN THERMOPLASTICS



Material OVERVIEW

Fractal graphene revolutionizes plastic performance by dramatically enhancing its mechanical properties. When incorporated into various plastic matrices, fractal graphene creates stronger, lighter, and more durable materials with lower environmental impact. Our pristine fractal graphene powder delivers these improvements with incredibly low concentrations compared to conventional graphene nanoplatelets. Fractal graphene is particularly well suited to applications where traditional reinforcing additives such as talc, calcium carbonate, chopped glass fibre, and chopped carbon fibre have either reached their performance limits or where these polymer fillers are simply unsuitable options due to the melt processing techniques involved or part dimensions required. Fractal graphene therefore offers an entirely unique solution for mechanical reinforcement for applications with thin gauges and fine feature sizes.

Thermoplastic Polymers

Applicable for a wide range of thermoplastics, including Polyethylene (PE), Polypropylene (PP), Polyethylene Terephthalate (PET), Polyamide (PA), Polyetheretherketone (PEEK), and many others.

Fractal Graphene Enhancement

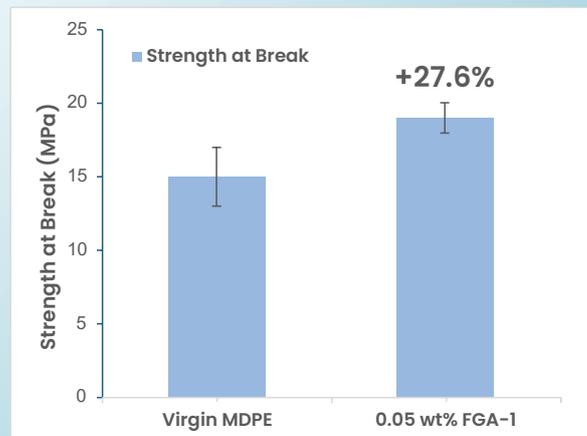
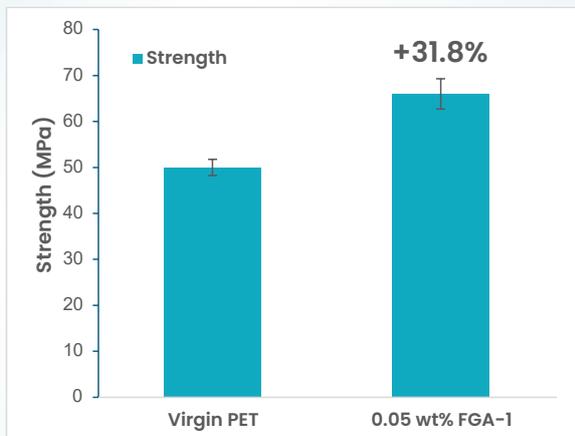


Chart: High increases in strength, at low % loadings of FGA-1 (Fractal Graphene Aggregate) in injection molded profiles of PET and MDPE

Applications

- Industrial packaging (films, drums, containers)
- High performance fibres (technical textiles)
- Automotive components (fuel and brake lines)
- Consumer packaging (bottles and films)
- Industrial components (bearings)

Manufacturing

- Injection molding
- Blow molding
- Film casting and extrusion
- Fibre spinning
- Rotomolding
- Extruded pipes and profiles

Loading Efficiency

Only **0.05%** fractal graphene delivers a significant mechanical boost—comparable performance with conventional graphene nanoplatelets requires 1–3% loading.

CONTACT US:

Ph: +1-785-380-4205

Email: info@hydrograph.com

GET CONNECT:

www.hydrograph.com

x.com/HydroGraphInc

ca.linkedin.com/company/hydrograph

HEAD OFFICE:

1199 W Hastings St #1100

Vancouver, BC V6E 3T5

Canada

HydroGraph Products

Fractal Graphene

Pristine turbostratic graphene of unsurpassed purity, identical batch-to-batch consistency and lowest environmental footprint.

- Pristine carbon structure (100% sp² hybridized)
- 99.8% carbon, 0.2% oxygen with no PAHs
- Thickness: 2-3 nm (average 6 graphene layers)
- Lateral dimensions: 20-50 nm
- Bulk mass density: 70-100 mg/cc
- BET specific surface area: 200 m²/g
- Composed of fractal aggregates of monomers (primary particles)
- Very dark, black, hydrophobic powder

Reactive Graphene

Functionalized turbostratic graphene featuring precise functional chemistry, identical batch-to-batch consistency and the lowest environmental footprint.

- Surface decorated with carboxylic acid (-COOH) functional groups
- 96.3% carbon, 2.1% oxygen, 1.6% hydrogen, no PAHs
- Thickness: 2-3 nm (average 6 graphene layers)
- Lateral dimensions: 10-50 nm
- BET specific surface area: 165 m²/g
- Composed of fractal aggregates of monomers (primary particles)
- Dark, black, hydrophilic powder

HydroGraph Advantage

Superior Quality

Highest purity graphene material in the market, exceptional particle size uniformity, identical batch-to-batch consistency, for unbeatable quality and reliability.

Ultra-low Addition Rates

Achieves exceptional performance at concentrations 10-100x lower than conventional graphene nanoplatelets, fundamentally transforming the economics for graphene technology.

Sustainable Advantage

Improves resource efficiency, reduces GHG emissions, inherently lowest energy footprint and carbon footprint graphene available.

The Fractal Future

The fractal structure—unique to HydroGraph's graphene—provides performance advantages that cannot be replicated by conventional graphenes. As industries increasingly seek sustainability by doing more with less, Fractal Graphene™ stands ready to transform the way products are formulated and manufactured.

Contact HydroGraph today to learn how Fractal Graphene™ can enhance your products and processes.



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