GRAFTech International | GRAF+™

APN13 Graphite Anode Powders

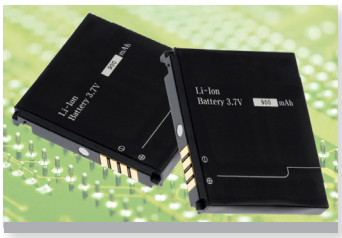
Technical Data Sheet 2002

APN13: Best in Class Natural Graphite Anode

- Outperforms competitive natural graphite anodes in retained capacity over a modified rate profile
- Excellent coatability and slurry rheology

Typical Applications

- Automotive
- Consumer electronics
- Power tools
- Renewable energy storage



Available Container Sizes

- 5kg increments up to 200kg
- Bulk packaging

Typical Properties*

Characteristic	Unit	APN13
Capacity**	mAh/g	≥ 368
First Cycle Efficiency**	%	≥ 92
Retained Capacity @ 23°C (after 500 cycles)***	%	95
Retained Capacity @ 45°C (after 500 cycles)***	%	> 74
Tap Density	g/cc	>0.9
D10	µm	8.2
D50	µm	13.0
D90	µm	21.1
Ash	ppm	< 40
Fe	ppm	< 2
SSA	m^2/g	< 2.5
D002	Å	3.360

* Properties listed are typical and cannot be used as accept/reject specifications.
** Half cell data with Li counter electrode. Reported number is the average of the first 3 cycles.
Half cell (coil cell) testing conditions: 89% anode; 8% PVDF; 3% conductive carbon. CC 0.2C to 5mV, CV@5mV to I < 20µA; 0.2C to 2V. Compressive density, ~1.2 g/cc.
*** Full cell construction is prismatic 63450 with NCM cathode.

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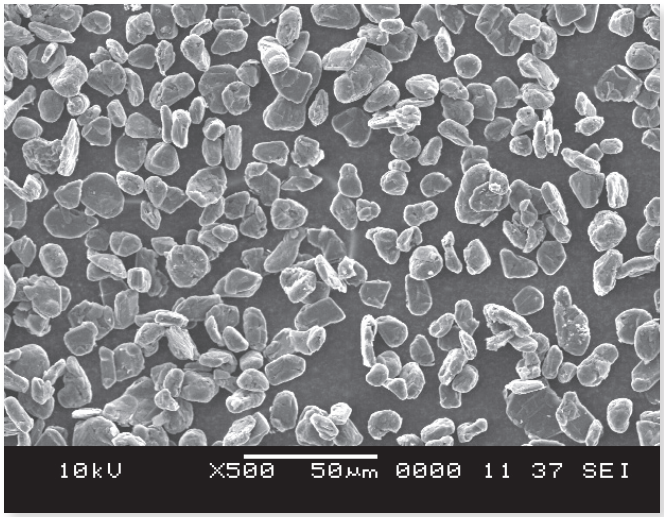

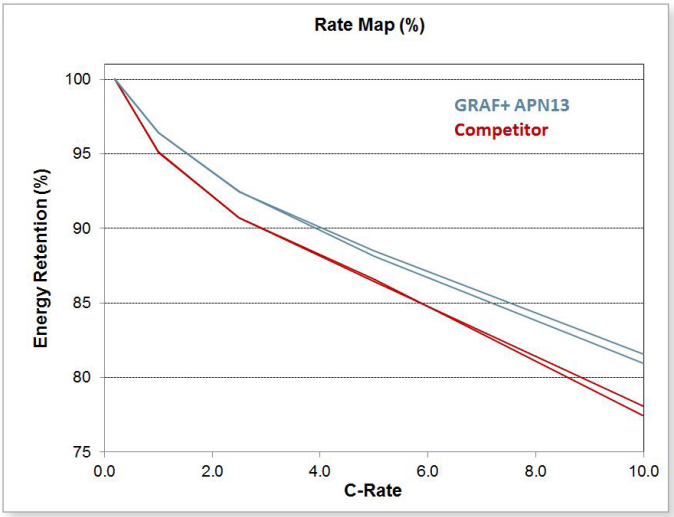

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- *Excellent coatability and slurry rheology*

GrafTech is Graphite

GrafTech International is a global company that has been redefining limits for more than 125 years. We offer innovative graphite material solutions for our customers in a wide range of industries and end markets, including steel manufacturing, advanced energy and latest generation electronics. GrafTech operates 20 principal manufacturing facilities on four continents and sells products in over 70 countries. Headquartered in Parma, Ohio, GrafTech employs 3,000 people.

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From the development of the first electric arc lamp to the cutting edge technology of electronic thermal management, GrafTech's history and world-renowned Research & Development center underscores its commitment to innovating and manufacturing engineered solutions across all the industries it serves.

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- *16 R&D 100 Awards recognizing groundbreaking technology*
- *125+ scientists, engineers and R&D professionals*
- *Extensive testing facilities and capabilities*
- *Equipment to duplicate or simulate process technology*
- *Lean manufacturing expertise*

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Redefining limits

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