



NTeC[®]-E Conductive Additives for LIBs

CHASM ADVANCED MATERIALS, INC.



Summary

CHASM's NTeC[®]-E CNT additives for Li-ion batteries (LIBs) provide high quality carbon nanotubes that are a drop-in replacement for industry-standard CNTs. With CNTs becoming essential for today's EV batteries, CHASM is uniquely positioned to support surging demand with exceptional performance and breakthrough technology that enables low cost, scalable and sustainable production for crucial local supply of CNTs in the U.S. and Europe.



Benefits

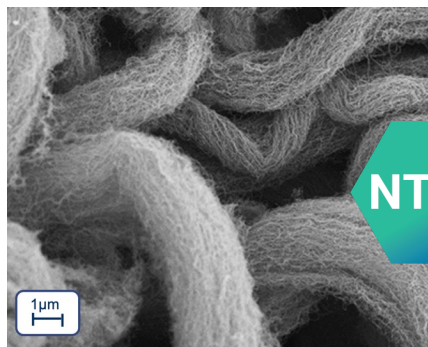
- ✓ Drop-in replacement CNTs for Li-ion batteries
- ✓ Lowest cost, most scalable, sustainable production
- ✓ High purity, using Iron free catalyst
- ✓ Tailored CNT structure for low loadings and easy dispersion



Exceptional Performance

- ✓ CNT quality \geq leading CNT suppliers based in Asia

Property	Typical Value	Test Method
CNT Purity (wt %)	> 99.5	TGA
Metal Content (ppm)	< 2,000	ICP
Iron Content (ppm)	< 10	ICP
Median Outer Diameter (nm)	10	TEM
Median Length (μ m) <i>post synthesis</i>	> 10	SEM
Median Length (μ m) <i>post dispersion</i>	1 - 2	SEM
Specific Surface Area (m^2/g)	>300	BET
Intensity Ratio of G/D band (I_G/I_D)	> 1.4	Raman



High aspect ratio, high purity CNTs tailored for Li-ion batteries



Dispersions are available, aqueous or solvent, with or without binder



Why Carbon Nanotubes (CNTs)?

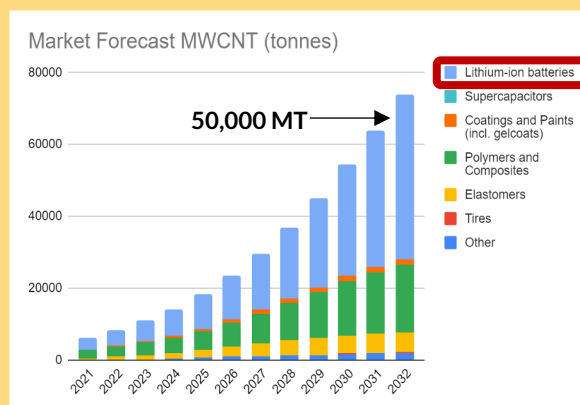
Carbon nanotubes are critical for EV batteries, offering several benefits over other conductive carbon additives, including:

- ✓ **Excellent electrical conductivity**, providing much lower internal resistance
- ✓ **Longer cycle life** due to high structural strength and toughness
- ✓ **Improved charge rate performance** through stronger bond between active materials and current collectors
- ✓ **Better heat dissipation** during charging and discharging



Surging Demand for CNTs

Worldwide demand for CNTs for the Li-ion battery market is forecasted to grow to 50,000 metric tons by 2032, five times greater than current capacity*



* Source: IDTechEx Carbon Nanotubes 2022-2023 Report



Battery Industry Challenges

- 1 Scaling up CNT production to meet demand
- 2 Secure CNT supply for US and European markets



CHASM Approach to Meet Demand



Manufacture CNTs in collaboration with strategic partners and provide **licenses for global production**.



For information about NTeC[®]-E conductive additives for LiBs
Contact : Sales@chasmtek.com.
Chasmtek.com





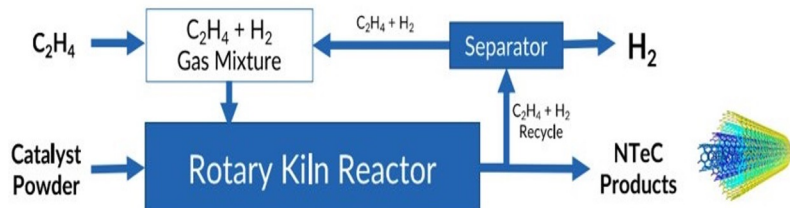
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Low-Cost, Scalable CNT Production

CHASM's new CNT production platform offers the most scalable, cost-efficient and sustainable approach for mass production of high-quality CNTs tailored for Li-ion batteries.

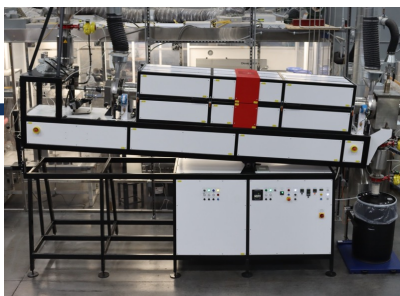


Cost and scalability advantages result from the combination of CHASM's unique catalyst and rotary kiln reactor technologies for CNT synthesis. The combination enables a smaller reactor footprint, iron-free CNT production and sustainable separation and recycling of reactor output.



World's Largest Production Platform

CHASM is building the world's largest CNT production platform, on track for 2024 deployment in the USA.



2022

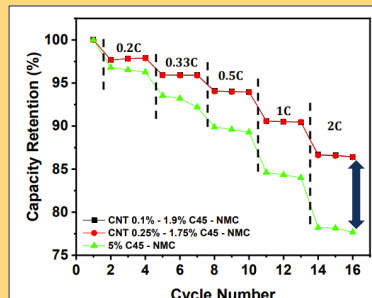
Generation 3
Capacity: 50 MTA
Norman, OK, USA

2024

Generation 4
World's Largest CNT Reactor
Capacity: 1,500 MTA

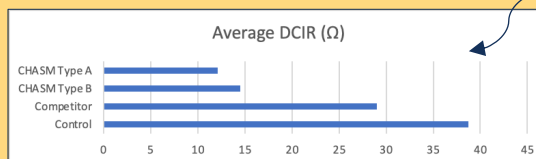


Independent 3rd Party Lab Validation



Argonne National Lab used CNT/NMP dispersions made at CHASM for making cathode slurry to create NMC cathodes.

AUDIANCE used two types of CNT/NMP dispersions made at CHASM for making slurries to create NMC cathodes.

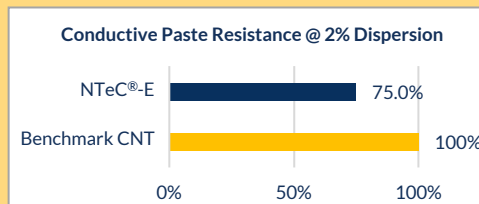


View more details about third-party validation test results [here](#).



Drop-in CNT with Better Performance

Evaluation by leading dispersion company with industry standard processes.



25% lower conductive paste resistance

50% lower viscosity at same CNT loading



Samples Available!



Powder and dispersion samples available.



Custom dispersions for aqueous and NMP solutions.



Seeking collaboration with:

- ✓ Manufacturing partners for global CNT production
- ✓ Channel partners for supplying CNT dispersions



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