TECHNICAL DATA SHEET

SWCNT Conductive Slurries for Battery Electrodes

Product code: CTIS series (CTIS-NMP · CTIS-AQ), with Li-ion, Na-ion and dry-electrode performance data

Revision 2026-09

Description

Ready-to-use SWCNT conductive slurries formulated for cathode and anode coating lines, primer/undercoat application on Cu and Al foil, and tab coatings. SWCNTs from the CTI series are dispersed at high aspect ratio in NMP (with PVDF-compatible dispersant) or water (with CMC/aqueous binder compatibility). A small SWCNT dose builds a micro-conductive network that improves rate performance, cycle life and electrode mechanical integrity while freeing active-material volume.

Product Forms

Code	Medium	SWCNT grade	Solids content	Intended use
CTIS-NMP	NMP	CTI600 / CTI2000	To customer specification	NMC/NCA/LFP cathodes, PVDF systems
CTIS-AQ	Water	CTI2000	To customer specification	Si, Si-graphite and graphite anodes; Na-ion; foil primer coatings

Battery Applications

- Electrode conductive networks: coated on Li-ion and Na-ion cathodes and anodes for lower internal resistance, better rate and longer cycle life.
- Silicon anodes: the flexible 3D SWCNT network buffers silicon volume expansion and prevents electrode pulverization during cycling.
- Current collectors: SWCNT composite coatings on Cu/Al foil reduce foil thickness, cut cell weight, improve active-material adhesion, prevent corrosion and mitigate thermal-runaway risk.
- Key component coatings: conductive tab coatings reduce contact resistance.
- Solid-state batteries: improves solid–solid interfacial contact and both electronic and ionic conductivity in composite electrodes.
- Dry-process electrodes: compatible with low-solvent, high-compaction PTFE fibrillation; simplifies process and improves cycle life.

Silicon Anode Performance (Representative Data)

Cell test with 2 wt% SWCNT incorporated into pure silicon anode material. Coin-type half-cell cycling at 0.5C: greater than 92% capacity retention after 100 cycles, stable long-term cycling, Coulombic efficiency approximately 99.95%. In prelithiated silicon-oxide and CVD silicon-carbon full cells (3 A and 1.5 A discharge to 2.5 V, 75 °C cutoff), SWCNT-containing electrodes showed improved long-term capacity retention compared to cells without SWCNT.

Sodium-Ion Performance (SP+SWCNT vs SP+MWCNT) (Representative Data)

Formulation	Areal density	Loading	Specific capacity	-18 °C 6C 10 s pulse (V)	-30 °C 6C 10 s pulse (V)	Cycle life 25 °C 2C 5000 cyc	Flexibility / adhesion	Compaction
SP + MWCNT	1.67	95%	92.73	2.21	1.851	>92.5%	NG / NG	≤2.0

Formulation	Areal density	Loading	Specific capacity	-18 °C 6C 10 s pulse (V)	-30 °C 6C 10 s pulse (V)	Cycle life 25 °C 2C 5000 cyc	Flexibility / adhesion	Compaction
SP + SWCNT	1.80	96.75%	93.3	2.310	2.024	>91.18%	OK / OK	≥2.05
SWCNT advantage	+7%	+1.75%	N/A	+100 mV	+170 mV	N/A	Improved	+2%

Voltage range 1.5–3.4 V. SWCNT also raised the -18 °C 100% SOC 6C pulse voltage by 80 mV. SWCNT cushions the larger volume change of sodium-ion electrode materials and prevents pulverization.

Carbon-Coated Aluminum Foil (SWCNT slurry reinforcement) (Representative Data)

Base foil (μm)	Single-side coating (μm)	Sample width (mm)	Test speed (mm/min)	Max tensile force (N)	Tensile strength (MPa)
4	0	15	20	5.05	67.34
4	1	15	20	10.87	144.95
4	2–3	15	20	20.25	270.11

MD-direction tensile strength improvement of up to ~200% on 4 μm Al foil; similar gains on 8 and 12 μm Al and 6/8 μm Cu foils. Enables thinner foils, higher energy density and improved safety.

Dry Electrode Notes

- Extremely high aspect ratio forms a penetrating conductive path at low dosage, lowering internal resistance and improving rate performance.
- Fibrous structure adds bonding and reinforcement, addressing brittleness, powder shedding and delamination at high compaction density.
- Good compatibility in mixing, film-forming and rolling; low dosage and high utilization raise energy density.

Handling

- Store sealed at 5–30 °C; re-disperse by gentle stirring before use. Shelf life 6 months sealed. See SDS for solvent handling (NMP grade).

Ordering, Packaging & Documentation

- Available from evaluation quantities through multi-ton annual supply agreements; ISO 9001 certified production.
- Each lot ships with a representative Certificate of Analysis; Raman, TGA, SEM/TEM data available on request.

All values are representative of typical production and do not constitute a lot-specific guarantee. Certificates of analysis accompany each shipment.

- Safety Data Sheet available at cheaptubes.com/nanomaterial-msds-safety-sheets.

Values are typical unless stated as limits. Application results depend on formulation, equipment and process conditions; confirm with your own trials. Cheap Tubes Inc. makes no warranty of fitness for a particular purpose beyond the published specification.

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