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Battery Powder Materials Catalog

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KINTEK SOLUTION

COMPANY PROFILE

>>> About Us

KINTEK Solution is a technology-driven innovator specializing in comprehensive laboratory equipment for battery R&D and advanced materials research. Our portfolio spans the entire cell fabrication workflow—from mixing, coating, and precision pressing (automatic, heated, isostatic) to cell assembly and testing. Also essential in ceramics and powder metallurgy, our systems prioritize precision, safety, and repeatability, empowering researchers and industrial labs to achieve groundbreaking results.

Conductive Carbon Black Super P Li Battery Grade Conductive Additive Powder For Lithium Ion Electrodes

Item Number: CL24

Introduction

Engineered for high performance energy storage systems this ultra pure conductive carbon black super P Li powder enhances electrode electronic conductivity minimizes internal cell resistance and delivers superior cycling stability across demanding lithium ion battery applications worldwide

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Application	Description	Key Benefit
Lithium-Ion Battery Cathodes	Blended with active materials such as NMC811, LFP, and LCO in slurry formulations alongside PVDF binder.	Forms a continuous conductive matrix that reduces cathode polarization and optimizes rate capability during rapid discharge.
Silicon-Graphite Anodes	Formulated into high-capacity composite anodes subject to significant volumetric expansion during lithiation.	Maintains continuous electrical contact across expanding silicon particles, mitigating capacity fade over prolonged cycling.
Next-Generation Solid-State Batteries	Distributed into solid composite cathode matrices alongside solid electrolytes (sulfide, oxide, or polymer types).	Lowers interparticle contact resistance across rigid solid-solid interfaces without degrading electrochemical stability windows.
Sodium-Ion and Potassium-Ion Cells	Used as the primary conductive agent for hard carbon anodes and layered oxide / Prussian blue analogue cathodes.	Accommodates larger ionic radii insertion dynamics by ensuring fast electron exchange at the active material interface.
Electrochemical Supercapacitors	Compounded with high-surface-area activated carbon or pseudocapacitive metal oxides on aluminum current collectors.	Lowers equivalent series resistance (ESR) and improves high-frequency response in pulse-power energy storage systems.
Primary Lithium Battery Chemistries	Incorporated into lithium-manganese dioxide (Li-MnO2) and lithium-thionyl chloride (Li-SOCl2) cell formulations.	Prevents cathode passivation and maximizes pulse current discharge reliability over multi-year operational lifespans.
Conductive Polymers and Antistatic Coatings	Compounded into thermoplastic elastomers, epoxy matrices, and ESD-safe packaging films.	Imparts permanent antistatic properties and electrostatic dissipation capability at low percolation thresholds without compromising mechanical strength.
Fuel Cell Catalyst Layers	Dispersed alongside platinum-group metal catalysts in proton exchange membrane (PEM) electrode layers.	Enhances catalyst layer electronic conductivity and mass transport porosity for optimized oxygen reduction reaction kinetics.

Parameter	Unit	Specification Standard	Typical Value (Item Code: CL24)
Apparent Bulk Density	kg/m³	160 ± 20	160
Specific Absorption (DBP)	mL / 5g	32 ± 2	31.5
BET Specific Surface Area	m²/g	62 ± 5	63
Moisture Content	wt%	Max 0.3	0.10
Total Sulfur (S)	wt%	Max 0.03	0.009
Volatile Matter	wt%	Max 0.15	0.11
Total Ash Content	wt%	Max 0.05	0.01
Trace Iron (Fe)	ppm	Max 10	2.1
Trace Nickel (Ni)	ppm	—	0.1

Parameter	Unit	Specification Standard	Typical Value (Item Code: CL24)
pH Value	—	8.0 – 11.0	9.2

Lithium Ion Secondary Battery Cathode Material Ncm532 Nmc Ternary Powder

Item Number: CL02

Introduction

High performance lithium ion secondary battery cathode material NCM532 NMC ternary powder delivers superior energy density structural stability and exceptional cycling efficiency for advanced cell fabrication energy storage systems and electric vehicle research applications.

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Application	Description	Key Benefit
Electric Vehicle (EV) Traction Cells	Active material for prototyping and manufacturing high-capacity pouch, cylindrical (18650/21700), and prismatic traction battery cells.	Balances high specific energy density with robust thermal safety and extended cycle life under dynamic driving profiles.
Stationary Energy Storage Systems (ESS)	Formulation into long-duration energy storage cells for residential, industrial, and microgrid applications.	High structural integrity and minimal capacity fade rate reduce levelized cost of storage (LCOS) over multi-year deployments.
Consumer Electronics & Power Tools	Cathode production for compact, high-drain batteries used in mobile devices, robotics, drones, and cordless power tools.	Delivers high 1C rate capability (155.2 mAh/g) and compact volumetric density to maximize runtime in constrained dimensions.
Academic & Industrial Battery R&D	Standardized benchmark material for evaluating novel solid-state electrolytes, functional liquid electrolyte additives, and advanced binders.	Highly reproducible baseline parameters and tight compositional control ensure accurate, publishable, and commercially translatable experimental data.
Electrode Calendering & Slurry Process Optimization	Pilot-scale optimization of slurry mixing viscosity, roll-to-roll slot-die coating speeds, and electrode calendering densities.	Controlled D50 particle sizing (10.6 µm) and low moisture (0.07%) prevent slurry gelling and yield ultra-smooth, uniform electrode foils.
Hybrid & Solid-State Battery Research	Integration into composite cathode architectures with inorganic solid electrolytes (sulfides, oxides) or polymer electrolyte matrices.	Low specific surface area (0.27 m²/g) and low surface residual base levels mitigate interfacial impedance growth at solid-solid contact boundaries.

Parameter Category	Metric / Property	Unit	Specification Standard	Typical Reference Value	Test Method / Conditions
Product Identification	Product Code / Item Number	-	CL02	CL02	Reference Standard
Product Identification	Chemical Formula	-	LiNi0.5Co0.2Mn0.3O2	LiNi0.5Co0.2Mn0.3O2	Stoichiometric Composition
Product Identification	Physical Appearance	-	Gray-black powder, agglomerate-free	Conforms	Visual Inspection
Product Identification	Standard Packaging	-	500 g / bag	500 g / bag	Sealed Moisture-Barrier Bag
Physical Properties	Particle Size D10	µm	≥ 5.0	6.4	MS2000 Particle Size Analyzer
Physical Properties	Particle Size D50	µm	8.0 – 12.0	10.6	MS2000 Particle Size Analyzer
Physical Properties	Particle Size D90	µm	≤ 25.0	17.5	MS2000 Particle Size Analyzer
Physical Properties	Moisture Content	%	≤ 0.10	0.07	Sartorius Moisture Analyzer
Physical Properties	pH Value	-	≤ 11.6	11.35	Mettler Toledo pH Meter
Physical Properties	Specific Surface Area (BET)	m²/g	0.20 – 0.60	0.27	BET Surface Area Analyzer

Parameter Category	Metric / Property	Unit	Specification Standard	Typical Reference Value	Test Method / Conditions
Physical Properties	Tap Density	g/cm³	≥ 2.0	2.20	ZS-203 Tap Density Tester (3000 taps / 3 mm amplitude)
Chemical Composition	Lithium (Li) Content	%	7.0 – 8.0	7.1	ICP-OES
Chemical Composition	Total Transition Metals (Ni+Co+Mn)	%	57.0 – 62.0	59.2	ICP-OES
Chemical Composition	Calcium (Ca) Impurity	%	≤ 0.0200	0.0035	ICP-OES
Chemical Composition	Copper (Cu) Impurity	%	≤ 0.0050	0.0002	ICP-OES
Chemical Composition	Iron (Fe) Impurity	%	≤ 0.0010	0.0003	ICP-OES
Chemical Composition	Sodium (Na) Impurity	%	≤ 0.0300	0.0188	ICP-OES
Electrochemical Properties	0.5C Coin Cell Specific Capacity	mAh/g	≥ 158	160.1	vs. Li, 0.5C, 2.75V – 4.3V
Electrochemical Properties	1.0C Coin Cell Specific Capacity	mAh/g	≥ 153	155.2	vs. Li, 1.0C, 2.75V – 4.3V
Electrochemical Properties	Initial Coulombic Efficiency (ICE)	%	≥ 83	84.5	vs. Li, 0.5C, 2.75V – 4.3V

Carbon Coated Sodium Vanadium Phosphate Na3V2Po43 Powder Sodium Ion Battery Cathode Material

Item Number: CL10

Introduction

High purity carbon coated sodium vanadium phosphate Na3V2PO43 cathode powder engineered for advanced sodium ion battery research offering 3N purity uniform 1 to 2 micron particle distribution low impurity levels superior rate capability and exceptional structural stability during cycling

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Application	Description	Key Benefit
High-Rate Sodium-Ion Batteries	Fabrication of fast-charging cathode electrodes for power-oriented sodium-ion cells and pulse-power energy systems.	High 3D ionic diffusion coefficient enables stable discharge capacities at high C-rates without structural collapse.
Grid Energy Storage Systems (BESS)	Prototype development of large-format stationary energy storage cells targeting long cycle life and low system cost.	Polyanion framework ensures superior capacity retention over thousands of deep-discharge cycles at ambient and elevated temperatures.
Low-Temperature Battery R&D	Formulating sodium-ion chemistries capable of operating in sub-zero and extreme environmental conditions.	Low activation energy for sodium extraction/insertion maintains ion kinetics down to -20°C and below.
Electrochemical Kinetic Studies	Fundamental characterization of solid-state diffusion kinetics, phase transitions, and interphase formation via half-cell and symmetric cell testing.	High 3N chemical purity and precise stoichiometry eliminate parasitic baseline noise in analytical electrochemical measurements.
Hybrid Supercapacitor & Dual-Ion Devices	Use as a faradaic cathode coupled with capacitive carbon anodes in high-energy density asymmetric supercapacitors.	Combines high operating voltage with rapid charge-transfer kinetics to bridge the gap between batteries and supercapacitors.
Electrode Processing Optimization	Calendering, compaction density, and binder optimization studies using automated laboratory roll presses and coating lines.	Consistent 1–2 µm morphology provides predictable rheological behavior and uniform electrode porosity.

Specification Parameter	Value / Details
Product Identifier	CL10
Chemical Formula	Carbon-coated Na3V2(PO4)3 (C-NVP)
Core Composition Molar Ratio	Na : V : P : O = 3.0 : 2.0 : 3.0 : 12.0 (mol)
Purity (wt.%)	≥ 99.9% (3N Grade)
Carbon Content (wt.%)	3.0 wt.% (C : Na3V2(PO4)3 = 3 : 97 wt%)
Average Particle Size (D50)	1.0 – 2.0 µm
Physical Appearance	Greyish-black fine powder
Crystal Structure	NASICON (R-3c space group)
Theoretical Capacity	~117.6 mAh/g (based on two-electron reaction)
Operating Voltage Range	2.5 V – 3.8 V vs. Na/Na+
Impurity: Iron (Fe)	≤ 10 ppm
Impurity: Copper (Cu)	≤ 6 ppm

Specification Parameter	Value / Details
Impurity: Nickel (Ni)	≤ 20 ppm
Impurity: Silicon (Si)	≤ 30 ppm
Impurity: Aluminum (Al)	≤ 35 ppm
Impurity: Zirconium (Zr)	≤ 18 ppm
Impurity: Magnesium (Mg)	≤ 15 ppm
Impurity: Calcium (Ca)	≤ 7 ppm
Impurity: Potassium (K)	≤ 5 ppm
Impurity: Barium (Ba)	≤ 5 ppm

Sodium Nickel Iron Manganese Layered Oxide Cathode Material For Sodium Ion Batteries

Item Number: CL12

Introduction

High performance sodium nickel iron manganese oxide layered cathode material designed for sodium ion batteries delivers exceptional rate capability, high specific capacity, outstanding low temperature discharge retention, and superior slurry processing stability for commercial energy storage system cell manufacturing.

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Application	Description	Key Benefit
Stationary Grid Energy Storage	Large-scale battery energy storage systems (BESS) for renewable energy integration and grid frequency regulation.	Low material cost combined with long cycle stability and safe thermal characteristics under continuous operation.
Industrial Cylindrical Cell Fabrication	Commercial 18650 and 21700 cell production lines for industrial power tools and uninterruptible power supplies (UPS).	Excellent tap density (1.34 g/cm³) and smooth slurry coating characteristics enable uniform high-speed electrode manufacturing.
Low-Temperature & Harsh Environment Power	Battery modules operating in arctic conditions, cold-chain logistics, and unheated outdoor installations.	Exceptional low-temperature capacity retention (87.89% at -20°C) ensures dependable power delivery in extreme climates.
High-Rate Electric Mobility	Power packs for two/three-wheel electric vehicles, low-speed EVs, and automated guided vehicles (AGVs).	Maintains over 91.58% capacity retention at high 5.0C discharge rates, supporting rapid acceleration and fast power delivery.
Advanced Sodium-Ion Battery Research	Academic and corporate R&D laboratories developing next-generation sodium chemistries and electrolyte formulations.	Highly consistent physical specifications and low residual alkali provide repeatable baseline metrics for coin and pouch cell testing.

Specification Parameter	Unit	Target Specification Indicator	Typical Value	Test Method / Instrument
Product Identifier	-	CL12	CL12	Standardized Material Code
Appearance	-	Black Powder	Black Powder	Visual Inspection (□□)
Tap Density (□□□□)	g/cm³	≥ 1.20	1.34	GB/T 5162-2006
Specific Surface Area (□□□□)	m²/g	0.3 - 1.0	0.68	BET Specific Surface Analyzer (□□□□)
Moisture Content (H2O)	ppm	≤ 500	432	Moisture Analyzer (□□□)
Particle Size D10	μm	≥ 2.0	3.45	Laser Particle Size Analyzer (□□□□□)
Particle Size D50	μm	8.00 ± 2.00	7.64	Laser Particle Size Analyzer (□□□□□)
Particle Size D90	μm	≤ 24.00	17.03	Laser Particle Size Analyzer (□□□□□)
Sodium (Na) Content	wt%	20.50 - 21.00	20.72	Atomic Absorption Spectroscopy (AAS)
Combined Na + Fe + Mn Content	wt%	50.50 ± 1.00	50.63	GB/T 1223.25-1994 Gravimetric Method
Slurry pH	-	≤ 13.00	12.82	pH Meter (PG□)
Discharge Specific Capacity (□□□□)	mAh/g	≥ 120.0	127	Coin Half-Cell, 4.0V–2.0V, 0.1C Discharge

C-Rate Discharge Current	Relative Capacity (%)	Electrochemical Transport Characteristics
0.2C	106.40%	Maximum sodium-ion de-intercalation efficiency
0.5C	103.20%	High energy extraction under moderate loads
1.0C	100.00%	Reference capacity baseline
2.0C	98.40%	Minimal polarization voltage drop
3.0C	96.33%	Sustained fast-discharge power output
4.0C	94.45%	Outstanding high-power retention
5.0C	91.58%	Excellent ultra-high rate capability

Operating Temperature (°C)	Capacity Retention Ratio (%)	Environmental Performance Profile
25°C	100.00%	Ambient baseline capacity
-10°C	91.58%	Superior low-temperature ion diffusion
-20°C	87.89%	Robust operation under sub-zero conditions

Parameter / Condition	Standard Value / Metric	Operational Notes
Cathode Slurry Formulation Ratio	Active Material : SP : CNT : PVDF(5130) = 95.5 : 1.7 : 0.8 : 2.0	Optimized high-active mass fraction formulation
Slurry Solid Content	53%	Suitable for commercial industrial roll-to-roll coaters
Slurry Viscosity (Initial)	3540 mPa·s	Tested under 7% Relative Humidity (RH)
Slurry Viscosity (3 Hours)	4430 mPa·s	Stable viscosity growth profile
Slurry Viscosity (12 Hours)	6020 mPa·s	Controlled rheology over extended pot life
Slurry Viscosity (24 Hours)	6820 mPa·s	Prevents rapid phase separation or severe gelling
Environmental Exposure Resilience	7% RH for 5 hours exposure	Controlled moisture uptake; capacity does not decay

Lithium Rich Manganese Based Cathode Material For High Energy Density Lithium Ion Battery Research And Manufacturing

Item Number: CL15

Introduction

High capacity lithium rich manganese based cathode material delivers over 250 mAh per g with superior thermal stability lower raw material costs and exceptional energy density for next generation lithium ion battery pouch cells and coin cells.

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Application	Description	Key Benefit
Electric Vehicle (EV) Traction Batteries	High-energy cell prototyping for automotive battery packs requiring extended driving ranges and high thermal runaway thresholds.	Substantially reduces pack weight and raw material costs while maintaining superior structural and thermal safety at high cell voltages.
Heavy-Duty Cordless Power Tools	High-drain cylindrical and prismatic cell development demanding robust dynamic power delivery and thermal resilience.	Sustains reliable high-rate discharge kinetics (up to 3C) without localized overheating or structural lattice collapse.
Pouch and Coin Cell Electrochemical R&D	Academic and industrial research benchmarking solid-solution phase transitions, anionic redox reactions, and novel high-voltage electrolytes.	Delivers consistent, highly reproducible electrochemical data across standard 2032/2016 coin cells and multi-layer pilot pouch cells.
Grid-Scale Stationary Energy Storage (ESS)	Low-cost, long-duration energy storage modules designed for containerized solar/wind integration and commercial peak shaving.	Lowers cathode cost per kilowatt-hour by substituting expensive cobalt with abundant manganese in high-cycle-life formulations.
Consumer Electronics and Tablets	Ultra-thin pouch cell applications for laptops, tablets, and smart devices requiring maximized volumetric energy within constrained dimensions.	Achieves high active material tap density (2.00 g/cm³) and superior specific capacity to maximize single-charge device runtime.
Smart Toys and Robotic Devices	Compact energy storage solutions for automated guided vehicles, drones, and consumer robotics operating across wide temperature spectra.	Provides an economical, highly stable power foundation with low internal self-discharge and durable cycle performance.

Specification Parameter	Value / Characteristic
Product Identifier	CL15
Material Classification	Lithium-Rich Manganese-Based Solid-Solution Cathode Powder
Available Packaging Units	20 g / 100 g / 500 g / 1000 g sealed bottles/foil packs
Particle Size Distribution D10	4.90 µm
Particle Size Distribution D50	9.40 µm
Particle Size Distribution D90	16.8 µm
Specific Surface Area (BET)	0.70 m²/g
Tap Density	2.00 g/cm³
Nominal Specific Capacity	200 mAh/g (at 3.0 V – 4.6 V, 0.1C, 25°C)
Extended Voltage Capacity Window	≥ 250 mAh/g (at 2.0 V – 4.8 V)

Specification Parameter	Value / Characteristic
Standard Voltage Window	3.0 V to 4.6 V
Extended Testing Voltage Window	2.0 V to 4.8 V
Coin Cell Testing Conditions	25°C, 0.1C rate, 3.0 V to 4.6 V cut-off
Material pH Value	10.86
Moisture Content (H_2O)	~ 0.0335%
Iron (Fe) Impurity Level	~ 0.0032%
Copper (Cu) Impurity Level	~ 0.0000% (Not Detectable)
Magnesium (Mg) Content	~ 0.0129%
Gallium (Ga) Content	~ 0.0099%
Rate Capability Test Protocol	Charge: 25°C, CC at 0.5C to 4.8 V, CV until current < 0.02C; Discharge: CC at 0.1C / 0.2C / 0.5C / 1C / 2C / 3C down to 3.0 V
Cycle Life Test Protocol	Charge: 25°C, CC at 0.5C to 4.8 V, CV until current < 0.02C; Discharge: CC at 1C down to 3.0 V

Lithium Cobalt Oxide Lco Cathode Material For Lithium Ion Secondary Batteries

Item Number: CL16

Introduction

High performance lithium cobalt oxide LCO cathode powder engineered for lithium ion secondary batteries featuring exceptional tap density high first cycle efficiency superior rate capability and tight chemical purity for advanced commercial and research energy storage cell manufacturing

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Application	Description	Key Benefit
Consumer Electronics Battery Manufacturing	Fabrication of high-voltage pouch and prismatic cells for smartphones, laptops, wearables, and high-drain handheld devices.	High volumetric energy density and superior compaction density ($4.05\text{--}4.20\text{ g/cm}^3$) allow maximum capacity in space-constrained enclosures.
Standard Full-Cell Cell Production	Commercial cell assembly paired with high-capacity graphite anodes operating at 0.5C across a $3.0\text{V}\text{--}4.2\text{V}$ operating window.	Delivers a stable nominal full-cell design capacity of 145 mAh/g with predictable cycle life and low capacity fade.
Coin Cell R&D and Benchmarking	Assembly of CR2032/CR2016 half-cells and full-cells for cathode baseline testing, binder evaluations, and novel additive screening.	High initial efficiency ($\ge 96.0\%$) and well-defined particle size eliminate material variability during electrochemical research.
Electrolyte Formulation & Additive Studies	Evaluation of novel non-aqueous liquid electrolytes, solid-state electrolyte interfaces, and high-voltage film-forming additives.	Low residual surface Li_2CO_3 ensures clean interfacial reactions and accurate evaluation of electrolyte decomposition mechanisms.
Solid-State Battery Prototyping	Composite cathode fabrication for sulfide-, oxide-, and polymer-based solid-state lithium secondary battery research.	Smooth, unagglomerated gray-black powder with controlled BET surface area ($0.18\text{ m}^2/\text{g}$) provides uniform solid-solid contact.
High-Rate Energy Storage Devices	Production of specialty cells requiring rapid discharge performance and high voltage plateau retention under continuous 1C loading.	Maintains $\ge 151\text{ mAh/g}$ specific capacity at 1C discharge rate without excessive polarization or thermal escalation.

Specification Parameter	Technical Value
Product Item Number	CL16
Chemical Formula	$LiCoO_2$
Physical Appearance	Gray-black powder, agglomerate-free
Available Packaging Units	100 g/bag, 500 g/bag, 1000 g/bag

Element / Contaminant	Standard Specification	Measurement Method
Lithium (Li)	$6.80% \text{--} 7.20%$	Atomic Absorption Spectroscopy (AAS)
Cobalt (Co)	$59.00% \text{--} 61.00%$	Complexometric Titration
Sodium (Na)	$\le 0.0200%$	Inductively Coupled Plasma (ICP)
Calcium (Ca)	$\le 0.0200%$	Inductively Coupled Plasma (ICP)
Copper (Cu)	$\le 0.0200%$	Inductively Coupled Plasma (ICP)

Element / Contaminant	Standard Specification	Measurement Method
Iron (Fe)	$\le 0.0200%$	Inductively Coupled Plasma (ICP)
Magnetic Impurities	$\le 300\text{ ppb}$	Inductively Coupled Plasma (ICP)
Moisture Content	$\le 0.10%$	Sartorius Moisture Analyzer
Residual Lithium (Li_2CO_3)	$\le 0.08%$	Acid-Base Titration
pH Value	≤ 11.00	Mettler Toledo pH Meter

Parameter	Standard Specification	Measurement Method
Particle Size Distribution D_{10}	$\ge 5.5,\mu\text{m}$	MS2000 Laser Particle Size Analyzer
Particle Size Distribution D_{50}	$11.00,\mu\text{m} \text{--} 14.00,\mu\text{m}$	MS2000 Laser Particle Size Analyzer
Particle Size Distribution D_{90}	$\le 30.0,\mu\text{m}$	MS2000 Laser Particle Size Analyzer
Specific Surface Area (BET)	$0.18 \pm 0.100\text{ m}^2/\text{g}$	BET Surface Area Analyzer
Tap Density	$\ge 2.4\text{ g/cm}^3$	ZS-Type Tap Density Tester

Test Parameter	Specification Requirement	Test Conditions
0.1C Coin Cell Discharge Capacity	$\ge 157\text{ mAh/g}$	vs. Li/Li^+, 0.1C rate, $3.0\text{V}\text{--}4.3\text{V}$
1C Coin Cell Discharge Capacity	$\ge 151\text{ mAh/g}$	vs. Li/Li^+, 1C rate, $3.0\text{V}\text{--}4.3\text{V}$
First Cycle Efficiency	$\ge 96.0%$	vs. Li/Li^+, 0.1C rate, $3.0\text{V}\text{--}4.3\text{V}$
Full-Cell Design Capacity (Graphite Anode)	145 mAh/g	0.5C rate, $3.0\text{V}\text{--}4.2\text{V}$

Operational Stage	Recommendation / Requirement
Pre-Slurry Thermal Treatment	Vacuum bake powder at 120°C for 6 hours prior to mixing
Mixing Environment	Ambient relative humidity strictly controlled at $\le 30%\text{ RH}$
Electrode Compaction Density	Target design density: $4.05\text{--}4.20\text{ g/cm}^3$
Electrolyte Compatibility	Formulate with matched high-voltage LCO non-aqueous electrolyte
Sealed Storage Conditions	Store sealed away from direct sunlight at $20 \pm 10^\circ\text{C}$, relative humidity $\le 50%\text{ RH}$ (Shelf life: 1 year)
Unsealed Handling Conditions	Maintain storage humidity $\le 30%\text{ RH}$ after opening; process promptly

Lithium Nickel Cobalt Aluminum Oxide Nca Cathode Powder Material For Advanced Lithium-Ion Battery Fabrication And Energy Storage Research

Item Number: CL18

Introduction

High performance lithium nickel cobalt aluminum oxide NCA powder material engineered for high energy density lithium ion battery research and development delivering superior electrochemical discharge capacity exceptional tap density precise particle distribution and low residual surface alkali content.

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Application	Description	Key Benefit
Electric Vehicle (EV) Cell R&D	Prototyping high-nickel, high-voltage cylindrical (e.g., 21700, 4680) and pouch cells targeting extended driving ranges.	Delivers ≥ 200 mAh/g capacity while maintaining thermal and cycling stability under high-rate load conditions.
Advanced Electrolyte Formulation Screening	Testing novel liquid, gel, and solid-state electrolytes against high-capacity nickel-rich oxide surfaces under elevated cutoff voltages.	Low surface residual alkali ensures clean baseline interfaces, minimizing parasitic side reactions during testing.
Solid-State Battery Cathode Infiltration	Compounding into composite cathode layers (catholytes) with sulfide, oxide, or polymer solid electrolytes.	Controlled particle size distribution facilitates dense solid-solid contact and optimized ionic transport pathways.
High-Rate Energy Storage Devices	Developing high-power battery cells for power tools, robotics, and aerospace applications requiring rapid discharge capability.	High tap density and balanced surface area allow high volumetric loading without sacrificing rate performance.
Benchmark Reference Material	Serving as an industry-standard high-nickel positive electrode reference in academic and industrial electrochemical research.	Exceptional batch uniformity and rigorously validated physical parameters ensure reproducible experimental outcomes.
Calendering & Slurry Rheology Studies	Analyzing electrode microstructure evolution, binder migration, and porosity reduction during high-pressure roll compaction.	Tight particle size distribution yields uniform packing density and prevents electrode foil damage during calendering.

Item Code	Parameter / Test Item	Metric / Component	Specified Value / Control Standard	Test Instrument & Method
CL18	Packaging Unit	Net Weight	500 g / bag	Standard Sealed Packaging
CL18	Particle Size Distribution (PSD)	D10	5.5 ± 2.0 μm	Malvern Instruments MASTERSIZER2000
CL18	Particle Size Distribution (PSD)	D50	11.5 ± 2.0 μm	Malvern Instruments MASTERSIZER2000
CL18	Particle Size Distribution (PSD)	D90	21.0 ± 4.0 μm	Malvern Instruments MASTERSIZER2000
CL18	Particle Size Distribution (PSD)	Dmax	≤ 50.0 μm	Malvern Instruments MASTERSIZER2000
CL18	Moisture Content	Water Content	≤ 600 ppm	Metrohm 831-860 Karl Fischer Titration
CL18	Tap Density	Bulk Compaction Density	≥ 2.4 g/cm³	BT303 Tap Density Tester
CL18	Specific Surface Area (SSA)	BET Method	1.8 ± 0.5 m²/g	Micromeritics TriStar 3000
CL18	pH Value	Alkaline Index	≤ 11.7	METTLER TOLEDO FE30 pH Meter
CL18	Residual Alkali Content	Hydroxide (OH^-)	≤ 0.2 wt%	METTLER TOLEDO G20 Potentiometric Titrator

Item Code	Parameter / Test Item	Metric / Component	Specified Value / Control Standard	Test Instrument & Method
CL18	Residual Alkali Content	Carbonate (CO_3^{2-})	≤ 0.4 wt%	METTLER TOLEDO G20 Potentiometric Titrator
CL18	Electrochemical Performance	Specific Discharge Capacity	≥ 200 mAh/g	Half Cell Evaluation (0.1C/0.1C, 3.0–4.3V vs. Li^+/Li)

Lithium Ion Battery Anode Material Carboxymethyl Cellulose Cmc Powder

Item Number: CL19

Introduction

High purity carboxymethyl cellulose CMC powder engineered for lithium ion battery anode slurry preparation. This premium water soluble binder provides superior rheological control, strong adhesion, and stable cycling performance for advanced laboratory cell fabrication and energy storage research workflows.

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Application	Description	Key Benefit
Lithium-Ion Graphite Anodes	Thickening and stabilizing agent blended with SBR emulsion for synthetic and natural graphite slurries.	Prevents graphite settling, ensures uniform coating thickness, and enhances mechanical flexibility on copper foils.
Silicon-Graphite Composite Anodes	Structural binder component accommodating severe volume expansion in high-capacity silicon-dominant anodes.	Maintains cohesive particle-to-particle contact and mitigates active material pulverization during lithiation.
Lithium-Sulfur (Li–S) Cathodes	Aqueous binder and additive for sulfur-carbon composite cathodes undergoing multi-electron redox reactions.	Restricts soluble polysulfide migration via polar functional groups, dramatically improving cycling efficiency.
Sodium-Ion Battery Anodes	Water-soluble binder system utilized in hard carbon and non-graphitic carbon negative electrode formulations.	Delivers cost-effective aqueous processing, stable electrode cohesion, and resilient interphase boundary formation.
Supercapacitor Electrodes	Rheology modifier for activated carbon and high-surface-area porous carbon electrode slurries.	Enables defect-free thin-film casting and maximizes electrolyte wettability across porous electrode architectures.
Solid-State Battery Interlayers	Polymer additive in composite solid electrolyte interlayers and flexible electrode-electrolyte buffer films.	Enhances interfacial ionic contact and mechanical compliance at dynamic solid-state electrochemical interfaces.

Item Code	Parameter	Standard Value	Measured Value
CL19	Appearance	White powder	White powder
CL19	Purity	>99.5%	99.7%
CL19	Viscosity (2% Aqueous Solution)	7,000–10,000 mPa·s	7,458 mPa·s
CL19	Moisture (Water Content)	<10.0%	5.35%
CL19	Degree of Substitution (D.S.)	0.6–0.9	0.86
CL19	pH Value (Aqueous Solution)	6.0–8.5	6.77
CL19	Heavy Metals (as Pb)	<15 ppm	Compliant (Pass)
CL19	Iron Content (Fe)	<40 ppm	Compliant (Pass)
CL19	Arsenic Content (As)	<2 ppm	Compliant (Pass)
CL19	Primary Functional Role	Lithium Battery Anode Thickener	Verified
CL19	Standard Packaging	500 g/bag	500 g/bag

Carbon Coated Silicon Anode Material Silicon Carbon Composite Powder For Lithium Ion Batteries

Item Number: CL20

Introduction

High performance carbon coated silicon anode material engineered for next generation lithium ion battery development delivering exceptional discharge capacity low surface area optimized tap density superior initial coulombic efficiency and reliable cycle life stability across demanding electrochemical testing protocols.

Learn More

Application	Description	Key Benefit
High-Energy Cylindrical & Prismatic EV Cells	Blended with synthetic graphite (5 wt% to 20 wt%) in commercial-scale automotive pouch, 21700, and 4680 cylindrical cell designs.	Significantly boosts volumetric and gravimetric energy density while maintaining acceptable swelling limits and cycle life.
Consumer Electronics & Drones	Used in ultra-slim pouch cells for mobile devices, wearable technology, power tools, and unmanned aerial vehicles requiring maximum runtime per charge.	Provides high gravimetric capacity to maximize single-discharge operational duration within constrained physical dimensions.
Solid-State & Hybrid Battery Research	Employed as an active anode material in sulfide- and oxide-based solid-state battery investigations and hybrid solid-liquid configurations.	Forms stable interfacial contact with solid electrolytes and reduces void formation during cyclic volumetric shifts.
Electrochemical Kinetic Studies	Serves as a reference silicon-carbon composite in academic and corporate R&D laboratories analyzing SEI formation dynamics, binder interactions, and electrolyte additives.	High batch-to-batch purity and consistent morphological parameters deliver reproducible, publication-grade analytical data.
Electrode Processing Optimization	Utilized in pilot-line calendering and slurry rheology studies evaluating hot rolling, automatic pressing, and dynamic mechanical stability under high areal loadings.	Low specific surface area and uniform particle size ensure consistent coating rheology and predictable compaction behavior.

Specification Parameter	CL20-S400-A	CL20-S420-A	CL20-S450-A	CL20-S500-A
Discharge Capacity (mAh/g)	≥ 400	≥ 420	≥ 450	≥ 500
Initial Coulombic Efficiency (ICE, %)	91.0 ± 1.0	90.5 ± 1.0	88.5 ± 1.0	87.0 ± 1.0
Particle Size D10 (µm)	8.0 ± 2.0	7.5 ± 2.0	7.0 ± 2.0	6.5 ± 2.0
Particle Size D50 (µm)	16.5 ± 2.0	16.0 ± 2.0	15.0 ± 2.0	15.0 ± 2.0
Particle Size D90 (µm)	30.0 ± 3.0	30.0 ± 3.0	28.0 ± 3.0	28.0 ± 3.0
BET Specific Surface Area (m^2/g)	< 2.0	< 2.0	< 2.0	< 2.0
Tap Density (g/cm^3)	0.95 ± 1.0	0.95 ± 1.0	0.90 ± 1.0	0.90 ± 1.0
Pellet / Compacted Density (g/cm^3)	> 1.20	> 1.20	> 1.20	> 1.20
Standard Packaging	500 g / bag (vacuum sealed)	500 g / bag (vacuum sealed)	500 g / bag (vacuum sealed)	500 g / bag (vacuum sealed)

Supercapacitor Activated Carbon For Organic Electrolyte And Aqueous Electrolyte Energy Storage Systems

Item Number: CL21

Introduction

Engineered for high capacitance and low internal resistance, this supercapacitor activated carbon delivers optimal electrochemical performance across organic electrolyte and aqueous electrolyte energy storage systems. Request a technical quote today.

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Application	Description	Key Benefit
Electric Double-Layer Capacitors (EDLC)	Electrode fabrication for commercial symmetrical supercapacitors operating in organic electrolyte formulations.	Delivers high operating voltage windows (up to 2.7V–3.0V) and stable specific capacitance of 160 F/g with low ESR.
Aqueous High-Power Supercapacitors	Active material for water-based electrolyte energy storage devices requiring rapid high-current discharge.	Achieves high gravimetric capacitance (260–300 F/g) while maintaining excellent rate capability and environmental safety.
Lead-Carbon Hybrid Batteries	Negative plate additive in advanced lead-acid and lead-carbon energy storage batteries.	Suppresses negative plate sulfation, enhances partial-state-of-charge (PSoC) operation, and extends battery cycle life.
Hybrid & Asymmetric Capacitors	Cathode/anode complementary material paired with battery-type metal oxides or conductive polymers.	Bridges energy density and power density performance gaps, providing balanced power delivery and high cycle stability.
Proton Exchange & Direct Methanol Fuel Cells	Functional conductive catalyst support and porous diffusion layer additive for fuel cell assemblies.	Offers high chemical inertness, superior electronic conductivity, and reliable mass transport under acidic/alkaline environments.
Laboratory Materials & Electrolyte R&D	Standardized benchmark material for evaluating novel electrolytes, ionic liquids, and next-generation binder systems.	Ensures highly reproducible baseline performance data across various slurry formulations and cell testing architectures.

Specification Parameter	Organic Electrolyte Standard Variant (CL21-AC01)	High-Conductivity Organic Variant (CL21-AC03)	Aqueous Electrolyte High-Capacitance Variant (CL21-AC02)	Test / Analytical Standard
Target Electrolyte System	Organic Electrolyte (ACN / PC)	Organic Electrolyte (ACN / PC)	Aqueous Electrolyte (KOH / H_2SO_4)	Application Targeted
Specific Surface Area (BET)	2000 – 2500 m^2/g	1600 – 1700 m^2/g	2000 – 2500 m^2/g	Tristar II 3020 N_2 Adsorption
Pore Volume	Optimized Microporous	0.6 – 0.8 ml/g	Optimized High-Pore Network	Tristar II 3020
Reference Capacitance	~160 F/g (Organic System)	>140 F/g (Organic System)	260 – 300 F/g (Aqueous System)	Simulated Cell Cyclic Voltammetry / GCD
Ash Content	< 0.5%	< 0.5%	< 0.5%	GBT-12496.3
Moisture Content	< 10%	Trace	< 5%	Moisture Analyzer
Metallic Impurities (Fe)	Trace (< 50 ppm)	< 50 ppm	Trace (< 50 ppm)	ASTM Standard Method
Electrical Conductivity	High Electronic Conductivity	0.30 – 0.40 S/mm	High Electronic Conductivity	Four-Probe Measurement Method
Particle Size (D50)	~10 µm	5.0 – 8.0 µm	~10 µm	Laser Particle Size Analyzer

Specification Parameter	Organic Electrolyte Standard Variant (CL21-AC01)	High-Conductivity Organic Variant (CL21-AC03)	Aqueous Electrolyte High-Capacitance Variant (CL21-AC02)	Test / AnalyticalStandard
Bulk Density / Tap Density	Bulk Density: > 0.4 g/ml	Tap Density: 0.35 – 0.45 g/ml	Bulk Specific Weight: > 0.4 g/ml	GBT21354-2008
Molecular Weight	12 (Carbon matrix)	12 (Carbon matrix)	12 (Carbon matrix)	Nominal Carbon Basis
Packaging Unit	500 g / Sealed Barrier Bag	500 g / Sealed Barrier Bag	500 g / Sealed Barrier Bag	Moisture-Proof Hermetic Barrier

Carbon Coated And Uncoated Lto Lithium Titanate Powder Li4Ti5O12 Litio Battery Anode Material

Item Number: CL22

Introduction

High purity carbon coated and uncoated LTO lithium titanate powder Li4Ti5O12 LiTiO anode material delivers exceptional thermal safety ultra long cycle life and high rate capability for advanced energy storage systems electric vehicles specialty power supplies and hybrid supercapacitors.

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Application	Description	Key Benefit
Grid Energy Storage Systems (BESS)	Stationary frequency regulation, renewable peak shaving, and high-throughput microgrid storage infrastructure.	Delivers extraordinary calendar and cycle life with minimal capacity degradation, lowering long-term levelized cost of storage (LCOS).
Heavy-Duty Electric Vehicles & Transit	Rapid-charging electric buses, commercial delivery fleets, mining haulers, and railway auxiliary traction power.	Enables extreme 10C–20C fast-charging protocols without thermal runaway risk or lithium dendrite-induced short circuits.
Hybrid Supercapacitors & Pulse Power	Asymmetric high-rate energy storage devices bridging the gap between conventional batteries and electric double-layer capacitors.	Provides rapid pulse power delivery, instant regenerative braking absorption, and high volumetric energy storage.
Cold-Climate & Extreme Temperature Systems	Sub-zero military power packs, aerospace auxiliary power, and polar environmental monitoring equipment.	Maintains robust lithium-ion diffusion kinetics at low temperatures where conventional graphite anodes suffer severe plating and capacity drop.
Industrial AGVs & Material Handling	Continuous 24/7 automated guided vehicles, robotic warehouse fleets, and heavy automated forklifts.	Supports opportunity fast-charging in minutes rather than hours, maximizing fleet uptime and operational productivity.
Uninterruptible Power Supplies (UPS)	Mission-critical datacenter backup power, telecommunication base stations, and hospital emergency infrastructure.	Delivers instantaneous high-power discharge capability with maintenance-free, long-duration operational reliability.
Solid-State & Advanced Battery Research	Academic and industrial cell research exploring all-solid-state electrolytes, hybrid ceramic separators, and high-voltage cathode pairings.	Offers a stable, zero-strain baseline anode with well-characterized bonding mechanics and electrochemical kinetics.

Parameter	Unit	CL22-W (Uncoated)	CL22-B (Carbon-Coated)	Inspection Equipment / Method
Product Identifier	—	CL22-W	CL22-B	Factory Designation
Visual Appearance	—	Pure White Powder	Grey-Black Powder	Visual Inspection
Core Chemistry	—	Li4Ti5O12 (Spinel LTO)	C-Li4Ti5O12 Composite	Chemical Analysis
Purity	%	≥ 99.0	≥ 99.0	Chemical Assay / ICP-OES
Carbon Content	%	0	3.0 – 5.0	High-Frequency Combustion Analyzer
Particle Size D10	μm	0.2 – 0.6	0.2 – 0.6	Malvern Mastersizer 2000
Particle Size D50	μm	0.7 – 1.5	0.8 – 1.6	Malvern Mastersizer 2000
Particle Size D90	μm	≤ 10.0	≤ 10.0	Malvern Mastersizer 2000
Tap Density	g/cm³	≥ 0.9	≥ 1.0	Quantachrome Autotap DAT-3
BET Specific Surface Area	m²/g	≤ 16.0	≤ 6.0	Quantachrome NOVA 1000e

Parameter	Unit	CL22-W (Uncoated)	CL22-B (Carbon-Coated)	Inspection Equipment / Method
First Discharge Capacity (0.1C)	mAh/g	≥ 150.0	≥ 150.0	Half Cell (vs. Li/Li+, 1.0–2.5 V)
First Cycle Coulombic Efficiency	%	≥ 93.0	≥ 92.0	Half Cell Evaluation
Foreign Matter Screening	—	Pass (No residues)	Pass (No residues)	200-Mesh Standard Sieve Sampling
Primary Application Target	—	High Purity / Ceramic Electrolyte Compatibility	High-Rate Cycling / Power Systems	Application Specific

Highly Spherical And Irregular Hard Carbon Powder Lithium-Ion And Sodium-Ion Battery Anode Material

Item Number: CL23

Introduction

High-purity spherical and irregular hard carbon anode powders engineered for sodium-ion and lithium-ion battery research. Featuring high initial coulombic efficiency, controlled particle size distribution, exceptional purity, and outstanding rate performance for energy storage and advanced cell prototyping.

Learn More

Application	Description	Key Benefit
Sodium-Ion Battery Research	Serving as the core active anode material in coin cells, pouch cells, and cylindrical Na-ion prototypes.	Accommodates large sodium ions with minimal lattice expansion, delivering up to 283 mAh/g reversible capacity.
High-Rate Lithium-Ion Systems	Formulated into anode slurries for hybrid electric vehicles (HEV) and power tools requiring rapid charge-discharge dynamics.	Wide operating voltage window reduces localized lithium plating risks during high-current pulsing.
Low-Temperature Energy Storage	Utilized in specialized battery packs deployed in sub-zero and extreme-temperature grid environments.	Preserves open interstitial transport channels, preventing rapid impedance increases at sub-zero temperatures.
Binder & Slurry Rheology Optimization	Used in electrode processing studies to test novel aqueous and solvent-based binders (PVDF, CMC/SBR, PAA).	Consistent surface chemistry and low moisture allow accurate determination of binder-particle adhesion mechanics.
Calendering & Density Studies	Evaluated in laboratory roll-pressing and compaction trials to determine optimal electrode porosities.	Spherical grade exhibits uniform mechanical stress dissipation under high calendering pressures without particle fracture.
Stationary Grid Storage Prototyping	Integrated into multi-layer pouch and prismatic cells aimed at cost-effective, long-duration utility storage.	Abundant carbon-based chemistry eliminates dependency on critical raw materials like cobalt and nickel.

Parameter	Unit	Irregular Grade (CL23-IR)	Spherical Grade (CL23-SP)	Test Method / Equipment
Chemical Formula	-	C	C	Structural Standard
Molecular Weight	g/mol	12	12	Standard Atomic Weight
Physical Appearance	-	Black Powder	Black Powder	Visual Inspection
Particle Morphology	-	Irregular	Highly Spherical	Scanning Electron Microscopy
Particle Size D10	μm	3	5	Malvern Mastersizer 2000
Particle Size D50	μm	9	10	Malvern Mastersizer 2000
Particle Size D90	μm	25	27	Malvern Mastersizer 2000
Moisture Content	%	0.02	0.02	Mettler Toledo DL39 Karl Fischer
Carbon Content (C)	%	99.9	99.95	Sartorius BP121S Muffle Furnace KSW
Reversible Capacity	mAh/g	250	283 (Nominal 250–300)	Simulated Cell Evaluation
Initial Coulombic Efficiency (ICE)	%	83.5	85.0	Simulated Cell Evaluation
Primary Battery Suitability	-	Li-ion & Na-ion Anodes	Li-ion & Na-ion Anodes	Electrochemical Validation

Natural Graphite Powder For High End Lithium Battery Anode Material

Item Number: CL27

Introduction

Engineered for superior electrochemical performance, this high purity natural graphite powder delivers exceptional reversible specific capacity, low moisture content, optimized particle distribution, and high tap density for advanced high end lithium battery anode material fabrication and development.

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Application	Description	Key Benefit
High-Energy Lithium-Ion Pouch Cells	Utilized as the primary anode active material in laminated pouch cell configurations for EV and consumer electronics prototyping.	Delivers high volumetric energy density with stable long-term capacity retention.
Cylindrical Cell Development	Integrated into wound electrode architectures for 18650, 21700, and 4680 format high-capacity power cells.	Excellent calendering compressibility maintains electrode integrity under continuous winding tension.
Battery Slurry Formulation Research	Employed as an industry-standard baseline active material for evaluating novel conductive agents, dispersants, and functional polymer binders.	Highly repeatable physical properties provide reliable, reproducible experimental benchmarks.
Advanced Calendering & Compaction Studies	Used in roll press and heated calendering trials to determine optimal electrode porosity (target ~35%) and mechanical flexibility.	High tap density allows smooth consolidation without particle fragmentation or current collector debonding.
Grid-Scale Energy Storage Systems	Applied in long-life prismatic cell electrodes designed for stationary grid stabilization and renewable storage.	Low trace metal impurities minimize capacity fade over thousands of deep charge-discharge cycles.
Academic Materials Science Prototyping	Serves as high-purity active powder in laboratory coin-cell (CR2032/CR2016) half-cell and full-cell performance evaluations.	Complies with international testing standards for direct cross-comparison of electrochemical metrics.

Parameter Item	Unit	Specification	Inspection Instrument	Testing Standard	Sampling Frequency	Defect Classification
Product Identifier	-	CL27	Visual / Documentation	Internal QA Standard	Per Batch	Critical
Particle Size Distribution (D10)	μm	10.5 ± 1.5	Malvern Laser Particle Size Analyzer / MASTERSIZER 2000	Laser Diffraction Method GB/T 19077.1-2008 / ISO 13320-1:2000	1 sample / Bulk Batch	Major
Particle Size Distribution (D50)	μm	18.0 ± 1.5	Malvern Laser Particle Size Analyzer / MASTERSIZER 2000	Laser Diffraction Method GB/T 19077.1-2008 / ISO 13320-1:2000	1 sample / Bulk Batch	Major
Particle Size Distribution (D90)	μm	29.0 ± 3.0	Malvern Laser Particle Size Analyzer / MASTERSIZER 2000	Laser Diffraction Method GB/T 19077.1-2008 / ISO 13320-1:2000	1 sample / Bulk Batch	Major
Moisture Content	%	≤ 0.1	Karl Fischer Coulometric Moisture Titrator / DL39	Karl Fischer Method for Chemical Products GB/T 6283-2008	1 sample / Bulk Batch	Minor
Fixed Carbon Content	%	≥ 99.9	SARTORIUS-BP121S Analytical Balance & Muffle Furnace KSW	Graphite Chemical Analysis Method GB/T 3521-2008	1 sample / Bulk Batch	Major
Tap Density	g/mL	≥ 0.95	AutoTap Tap Density Tester	Metallic Powders Tap Density Test GB/T 5162-2006 / ISO 3953:1993	1 sample / Bulk Batch	Major
Specific Surface Area (BET)	m^2/g	3.0 ± 1.0	Specific Surface Area Analyzer	Gas Adsorption BET Method GB/T 19587-2004	1 sample / Bulk Batch	Major

Parameter Item	Unit	Specification	Inspection Instrument	Testing Standard	Sampling Frequency	Defect Classification
Iron (Fe) Impurity Content	ppm	≤ 50	Inductively Coupled Plasma Atomic Emission Spectrometer / Optima 2100DV	ICP-AES Method EPA 6010C	1 sample / Bulk Batch	Major
Specific Discharge Capacity	mAh/g	≥ 360	Half-Cell Testing System (0.05C to 5.0 mV, 0.1C to 2.0 V)	General Specification for Li-ion Batteries GB/T 18287-2000	1 sample / Bulk Batch	Reference
Initial Coulombic Efficiency	%	≥ 93	Half-Cell Testing System (0.05C to 5.0 mV, 0.1C to 2.0 V)	General Specification for Li-ion Batteries GB/T 18287-2000	1 sample / Bulk Batch	Reference

Lithium Ion Secondary Battery Cathode Material Lithium Nickel Cobalt Manganese Oxide

Item Number: CL01

Introduction

High performance lithium nickel cobalt manganese oxide cathode material for advanced lithium ion secondary batteries engineered with tight stoichiometric balance ultra low moisture and optimized particle distribution to maximize electrochemical capacity tap density and cyclability across demanding energy storage applications

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Application	Description	Key Benefit
Electric Vehicle (EV) Power Cells	Integration into high-energy cylindrical (e.g., 18650, 21700, 4680) and prismatic cell designs for automotive battery modules.	High volumetric energy density, dependable thermal threshold stability, and prolonged cycle life under rapid charge-discharge profiles.
Stationary Energy Storage Systems (ESS)	Formulation into large-format prismatic and pouch cells for utility-scale renewable grid stabilization and industrial uninterruptible power supplies (UPS).	Exceptional structural stability during long-term cycling, reducing system degradation and replacement frequency over multi-year operations.
Premium Consumer Electronics	Cathode active material for compact, high-capacity lithium-ion polymer batteries powering smartphones, laptops, drones, and wearable smart devices.	High tap density and uniform packing that enable ultra-thin, flexible electrode designs with maximum runtime per unit volume.
Battery R&D and Prototyping	Standardized reference cathode material for academic research, full-cell balancing experiments, electrolyte additive evaluations, and solid-state battery studies.	Reliable batch-to-batch chemical homogeneity, certified particle consistency, and predictable electrochemical baseline data.
Industrial Power Tools and Robotics	Utilization in high-drain secondary cells driving robotic automation systems, automated guided vehicles (AGVs), and heavy-duty cordless power equipment.	Superior rate capability, low internal impedance, and structural resilience under continuous high-current discharge pulses.
Specialty and Aerospace Battery Design	Development of mission-critical secondary cells requiring high specific energy coupled with strict environmental and safety compliance.	High chemical purity with tight trace impurity controls to eliminate random localized failure mechanisms in extreme operating environments.

Technical Parameter Group	Specific Metric / Analyte	Standard Requirement	Analytical Testing Method
Identification & Model	Product Identifier	CL01	Analytical Inspection
Packaging Configuration	Standard Packaging	500 g / bag (Sealed Protective Liner)	Gravimetric Standard
Appearance	Physical Morphology & Condition	Black solid powder, free of impurities, agglomerates, lumps, or oversized particles	Visual & Optical Inspection
Major Chemical Composition (%)	Lithium (Li) Content	7.3 ~ 7.9 %	Inductively Coupled Plasma (ICP)
Major Chemical Composition (%)	Cobalt (Co) Content	21.00 ± 1.00 %	Inductively Coupled Plasma (ICP)
Major Chemical Composition (%)	Manganese (Mn) Content	16.60 ± 1.00 %	Inductively Coupled Plasma (ICP)

Technical Parameter Group	Specific Metric / Analyte	Standard Requirement	Analytical Testing Method
Major Chemical Composition (%)	Nickel (Ni) Content	20.60 ± 1.00 %	Inductively Coupled Plasma (ICP)
Trace Impurities (μg/g)	Copper (Cu)	≤ 20 μg/g	Inductively Coupled Plasma (ICP)
Trace Impurities (μg/g)	Iron (Fe)	≤ 30 μg/g	Inductively Coupled Plasma (ICP)
Trace Impurities (μg/g)	Zinc (Zn)	≤ 20 μg/g	Inductively Coupled Plasma (ICP)
Trace Impurities (μg/g)	Sulfur (S)	≤ 3500 μg/g	Inductively Coupled Plasma (ICP)
Particle Size Distribution (μm)	D10	≥ 2.5 μm	Laser Particle Size Analyzer
Particle Size Distribution (μm)	D50 (Median Diameter)	7.5 ± 1.0 μm	Laser Particle Size Analyzer
Particle Size Distribution (μm)	D90	≤ 16.0 μm	Laser Particle Size Analyzer
Physical Properties	Specific Surface Area (BET)	0.25 ~ 0.45 m^2/g	Gas Adsorption Method
Physical Properties	Tap Density	≥ 2.2 g/cm^3	Tap Density Tester
Chemical Stability & Moisture	Moisture Content	≤ 500 μg/g	Karl Fischer Titration
Surface Chemistry	Soluble Lithium Dissolution	≤ 0.25 %	785 DMP Titrino Automatic Potentiometric Titrator
Surface Chemistry	pH Value	≤ 12	pH Meter
Regulatory & Safety Standard	Hazardous Substances Compliance	Fully compliant with SJ/T 11363-2006 requirements	Standard Laboratory Audit & Verification

Nmc Lithium Ion Secondary Battery Cathode Material Ncm622 Powder

Item Number: CL03

Introduction

High performance NCM622 NMC lithium ion secondary battery cathode material powder engineered for EV power cells and energy storage systems delivering superior 187 mAh per g initial capacity excellent rate capability high compaction density and exceptional thermal cycle stability

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Application	Description	Key Benefit
Electric Vehicle Traction Packs	Cathode active material for high-capacity cylindrical, prismatic, and pouch cells in EV/HEV drivetrains.	Balances high specific energy output with robust thermal safety and extended cycle life under dynamic loads.
Stationary Grid Energy Storage	Large-format lithium-ion battery modules for renewable energy buffering and frequency regulation.	Delivers reliable multi-year calendar life and stable charge acceptance across fluctuating temperature regimes.
Power Tools & High-Drain Devices	Rapid-discharge cell architectures requiring sustained power delivery at high C-rates.	Low internal impedance supports high power density and minimal voltage drop during pulse discharge.
Consumer Electronics	Thin-profile pouch cells for laptops, drones, smart appliances, and portable communication gear.	High volumetric energy density enables slim form-factor battery integration without sacrificing operating runtime.
Advanced Battery R&D	Standardized baseline cathode material for solid-state electrolytes, functional coatings, and novel binder research.	Highly consistent baseline electrochemistry ensures reproducible experimental data across multi-batch academic trials.

Classification	Parameter / Test Item	Standard Specification	Typical Reference Value	Test Method / Conditions
Product Identification	Item Number	CL03	CL03	Factory Designation
	Chemical Formula	LiNi0.6Co0.2Mn0.2O2	LiNi0.6Co0.2Mn0.2O2	Stoichiometric Composition
	Material Type	Lithium Nickel Cobalt Manganese Oxide	Power-Type NCM622	Industry Category
	Compliance Standard	YS/T 798-2012	Compliant	Chinese Industry Standard
	Appearance	Gray-black powder, no agglomerates	Gray-black powder	Visual Inspection
	Packaging Unit	500 g / bag	500 g / bag	Moisture-Proof Vacuum Sealed
Physical Properties	Particle Size D50 (μm)	4.0 ± 1.0	4.0	Laser Particle Size Analyzer
	Specific Surface Area (BET) (m^2/g)	0.5 ± 0.2	0.5	Nitrogen Adsorption (BET)
	Tap Density (TD) (g/cm^3)	1.8 ± 0.2	1.8	Tap Density Volumeter
	pH Value	≤ 11.5	11.0	Aqueous Solution pH Meter
	Residual LiOH (wt%)	≤ 0.20	0.10	Chemical Titration
	Residual Li2CO3 (wt%)	≤ 0.20	0.09	Chemical Titration
Chemical Composition	Lithium (Li) Content (%)	7.0 – 8.0	7.4	Inductively Coupled Plasma (ICP)
	Transition Metals (Ni+Co+Mn) (%)	57.0 – 62.0	58.6	Inductively Coupled Plasma (ICP)

Classification	Parameter / Test Item	Standard Specification	Typical Reference Value	Test Method / Conditions
	Calcium (Ca) Impurity (%)	≤ 0.0200	0.0016	ICP-OES Analysis
	Copper (Cu) Impurity (%)	≤ 0.0050	0.0001	ICP-OES Analysis
	Iron (Fe) Impurity (%)	≤ 0.0100	0.0021	ICP-OES Analysis
	Sodium (Na) Impurity (%)	≤ 0.0300	0.0152	ICP-OES Analysis
Electrochemical Metrics	First Discharge Capacity (mAh/g)	≥ 180.0	187.0	Half-Cell vs. Li, 0.1C (2.75V–4.3V)
	First Cycle Efficiency (%)	≥ 87.0	88.0	Half-Cell vs. Li, 0.1C (2.75V–4.3V)
	0.5C Coin Cell Capacity (mAh/g)	≥ 165.0	166.2	Half-Cell vs. Li, 0.5C (2.75V–4.3V)
	1.0C Coin Cell Capacity (mAh/g)	≥ 160.0	162.3	Half-Cell vs. Li, 1.0C (2.75V–4.3V)
	0.5C Coin Cell First Efficiency (%)	≥ 83.0	85.7	Half-Cell vs. Li, 0.5C (2.75V–4.3V)
	Full-Cell Design Capacity (mAh/g)	163.0 (Target)	163.0	vs. Graphite Anode, 0.5C (3.0V–4.2V)
Processing & Storage	Pre-Mixing Baking Condition	120°C for 6 hours	Recommended	Convection Vacuum Oven
	Recommended Compaction Density	3.20 – 3.40 g/cm³	3.30 g/cm³	Precision Calendering Roll
	Sealed Storage Conditions	Temp: 20 ± 10°C, RH ≤ 50%	Sealed Original Pack	Shelf Life: 1 Year
	Unsealed Storage Conditions	Relative Humidity ≤ 30% RH	Rapid Consumption	Inert Glovebox / Dry Room

Series 9 High Nickel Ncm Polycrystalline And Single Crystal Cathode Material For Lithium Ion Batteries

Item Number: CL05

Introduction

Engineered for high energy density lithium storage systems this premium Series 9 high nickel NCM cathode material delivers ultra high capacity exceptional first cycle efficiency low residual lithium content and superior cycling stability for cylindrical prismatic and pouch cells

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Application	Description	Key Benefit
Automotive EV Traction Cells	High-energy cell fabrication for electric passenger vehicles and commercial fleet powertrains in prismatic and pouch configurations.	Maximizes vehicle driving range via 214–217 mAh/g capacity while maintaining long-term cyclic retention.
High-Performance Cylindrical Cells	Applied in 18650, 21700, and 4680 cylindrical formats using polycrystalline powder for power tools and performance EVs.	Delivers high initial coulombic efficiency and superior compaction density for fast automated winding.
Premium Consumer Electronics	Thin-profile pouch cells for high-end smartphones, ultrabooks, and wearable devices requiring maximum energy density in compact footprints.	Enables thin electrode coatings with high volumetric energy density and minimal swelling during extended use.
Commercial Aerospace & Drones	Lightweight, high-capacity battery packs for unmanned aerial vehicles (UAVs), eVTOL craft, and electric marine propulsion.	Reduces total battery pack weight while delivering reliable high-voltage discharge profiles.
Grid-Scale Energy Storage	Advanced energy storage systems operating under high-utilization duty cycles requiring high round-trip energy efficiency.	Provides sustained multi-thousand-cycle durability with reduced degradation rates under controlled thermal conditions.
Solid-State Battery Research	Functional positive electrode active material for solid-state and semi-solid battery prototyping and interface characterization.	Low surface residual alkali ensures high interfacial compatibility with polymer, oxide, and sulfide solid electrolytes.

Parameter	CL05-C2 (Polycrystalline)	CL05-S (Single Crystal)
Product Item Number	CL05	CL05
Chemistry Classification	Ni90 High-Nickel NCM	Ni90 High-Nickel NCM
Crystal Structure / Morphology	Polycrystalline Spherical Agglomerate	Monolithic Single Crystal
Median Particle Size (D50)	12 ± 1.0 μm	3.5 ± 1.0 μm
Surface Residual OH^-	≤ 0.20 wt%	≤ 0.20 wt%
Surface Residual CO_3^{2-}	≤ 0.20 wt%	≤ 0.20 wt%
Specific Discharge Capacity (0.1C, Coin Cell)	217 ± 3 mAh/g	214 ± 3 mAh/g
First Cycle Efficiency (0.1C, Coin Cell)	89 ± 1 %	87 ± 1 %
Applicable Cell Form Factors	Cylindrical, Prismatic, Pouch	Prismatic, Pouch
Recommended Processing Environment	Dry Room (Dew Point ≤ -40°C)	Dry Room (Dew Point ≤ -40°C)

Battery Cathode Material Lithium Manganese Iron Phosphate Lmfp Powder

Item Number: CL13

Introduction

High performance lithium manganese iron phosphate LMFP battery cathode material powder engineered for next generation energy storage delivering 154.4 mAh per gram discharge capacity exceptional thermal safety superior voltage plateau stability and high first cycle efficiency for demanding electrochemical applications

Learn More

Application	Description	Key Benefit
Electric Vehicle (EV) Traction Cells	Formulating high-energy pouch and prismatic battery cells for electric passenger cars, light commercial vehicles, and electric buses.	Delivers up to 15-20% higher energy density than standard LFP while maintaining superior abuse tolerance and fire safety.
Stationary Grid Energy Storage Systems	Implementing long-duration utility and commercial battery storage modules designed for peak shaving and renewable integration.	Exceptional cycle life and chemical stability lower levelized cost of storage (LCOS) without requiring complex active cooling systems.
Low-Temperature Specialty Power	Powering drones, robotics, and industrial field equipment operating in sub-zero and fluctuating ambient temperatures.	Sub-micron D50 of 0.936 µm enables rapid ion kinetics and reduces polarization at low operating temperatures.
Solid-State Battery Research	Serving as a high-voltage, chemically stable cathode active material paired with sulfide, oxide, or polymer solid electrolytes.	Low moisture content (599.2 ppm) and stable olivine surface minimize side reactions at reactive solid electrolyte interfaces.
High-Rate Industrial Power Tools	Fabricating cylindrical 18650 and 21700 high-power cells for cordless tools, electric watercraft, and garden equipment.	Robust carbon conductive network (1.88% C) supports stable power delivery and rapid recharge capability.
Next-Generation Blend Cathodes	Blending with nickel-rich NMC/NCA chemistries to enhance composite thermal stability, reduce cost, and improve pack-level safety.	Acts as an internal thermal buffer and stabilizes overcharge events in hybrid cathode formulations.

Specification Category	Parameter	Value	Unit
Product Identification	Item Number	CL13	-
Particle Size Distribution	D10	0.327	µm
	D50	0.936	µm
	D90	14.786	µm
Physical & Surface Properties	Specific Surface Area (BET)	19.34	m^2/g
	Tap Density	0.98	g/cm^3
	Moisture Content	599.2	ppm
Chemical Composition	Lithium (Li)	4.3	%
	Manganese (Mn)	20.83	%
	Iron (Fe)	13.96	%
	Phosphorus (P)	19.01	%
	Carbon (C)	1.88	%

Specification Category	Parameter	Value	Unit
Electrochemical Performance	0.2C First Discharge Capacity	154.4	mAh/g
	0.2C Initial Discharge Efficiency	93.26	%

Prussian White Sodium Ion Battery Cathode Material Na2Mnfe Cn 6 Powder For Advanced Sodium Ion Energy Storage Research

Item Number: CL08

Introduction

High purity Prussian white sodium ion battery cathode material featuring a robust 3D open framework structure delivering high specific capacity of 130 mAh/g and excellent rate performance engineered for precision cell fabrication slurry processing and advanced energy storage battery research

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Application	Description	Key Benefit
Sodium-Ion Cell Prototype Assembly	Serves as the primary active cathode material for fabricating sodium-ion half-cells and full-cells in R&D laboratories.	Enables direct assembly with sodium-poor anodes without complex pre-sodiumation, saving preparation time.
High-Power Rate Performance Evaluation	Integrated into cathode slurry formulations to test rapid charge and discharge capabilities under high current densities.	Delivers 118 mAh/g specific capacity at 2C rates due to short ion diffusion pathways and open lattice channels.
Battery Slurry & Electrode Coating Research	Combined with conductive carbon additives and binders to evaluate rheological behavior and electrode film compaction.	Controlled D50 particle size (13.2 µm) ensures consistent doctor-blade slurry spreading and defect-free foil adhesion.
Long-Term Galvanostatic Cycle Life Studies	Subjected to extended cycling tests across diverse current rates to analyze degradation mechanisms and structural durability.	Retains 67.74% capacity after 300 cycles at a demanding 4C rate, validating long-term crystal framework stability.
Fundamental Electrochemical Kinetics Research	Utilized in academic and industrial laboratories to investigate sodium insertion dynamics, redox plateaus, and lattice strain.	Clear dual redox reaction centers yield distinct potential plateaus between 2.0V and 3.8V vs. Na/Na+.

Parameter	Specification Details (Item Ref: CL08)
Product Identification	Item CL08
Material Classification	Prussian White Cathode Powder (Sodium-Ion Battery Active Material)
Chemical Formula	Na2MnFe(CN)6
Physical Appearance	Fine White Powder
Particle Size Distribution (D10)	3.8 µm
Particle Size Distribution (D50)	13.2 µm
Particle Size Distribution (D90)	31.5 µm
Specific Surface Area (BET)	≤ 25 m^2/g
pH Value	8.34
First Charge/Discharge Specific Capacity (Na, 0.1C, 2.0–3.8V)	≥ 120 mAh/g
Specific Capacity at 0.2C Rate	~130 mAh/g
Specific Capacity at 2C Rate	118 mAh/g

Parameter	Specification Details (Item Ref: CL08)
Cycle Life Retention (4C Rate, 300 Cycles)	67.74%
Recommended Voltage Window	2.0 V to 3.8 V (vs. Na/Na+)
Hygroscopicity & Storage Guidelines	Readily absorbs moisture; requires moisture-proof sealing. Store at room temperature. Use promptly after opening or store within an inert atmosphere glove box.
Transport Safety Classification	Non-flammable solid; safe for transit in intact, sealed packaging

Mcmb Mesocarbon Microbeads Anode Material For High Energy Density Lithium Ion Batteries

Item Number: CL26

Introduction

Engineered MCMB mesocarbon microbeads deliver high reversible capacity over 330 mAh/g, initial efficiency above 93%, and low surface area. Designed for advanced battery R&D, this material ensures optimal compaction, minimal electrolyte decomposition, and superior rate performance.

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Application	Description	Key Benefit
High-Energy-Density Coin Cell Prototyping	Standard half-cell and full-cell testing in CR2016, CR2025, and CR2032 formats for baseline active material benchmarking.	Delivers repeatable capacity ≥330 mAh/g and stable SEI formation for precise academic and R&D comparative analytics.
Fast-Charging Pouch Cell Development	Multi-layer stacked pouch cell fabrication evaluating fast-rate capability and low-temperature kinetic performance.	Edge-plane orientation allows accelerated radial lithium-ion transport, reducing polarization during rapid charging cycles.
Precision Electrode Calendering Studies	High-pressure roll pressing and heated calendering research targeting ultra-dense electrode coatings.	Spherical particles withstand multi-ton linear pressing loads without fracturing, achieving target volumetric density.
Electrolyte Additive & SEI Characterization	Evaluation of novel film-forming additives, ionic liquids, and solid-state electrolyte interfaces.	Low baseline surface area provides an exceptionally clean interface for tracking specific additive passivation mechanisms.
Solid-State and Hybrid Cell Research	Integration into composite solid electrolyte (CSE) matrices and dry electrode processing workflows.	Isotropic particle shape enables uniform point-to-point contact with solid electrolytes, lowering interfacial charge-transfer resistance.
Pilot-Scale Roll-to-Roll Slurry Coating	Continuous continuous-feed coating onto copper foil substrates using pilot doctor-blade and slot-die systems.	Consistent particle size distribution prevents nozzle clogging and agglomerate striping, delivering high mass-loading uniformity.

Parameter / Test Item	Sub-Parameter	Unit	Specification Standard	Test Instrument & Method
Product Identifier	Model Code	—	CL26	Manufacturer Standard
Particle Size Distribution (PSD)	D10	µm	6.0 – 9.0	Malvern Mastersizer 2000 Laser Particle Size Analyzer
	D50	µm	10.0 – 14.0	Malvern Mastersizer 2000 Laser Particle Size Analyzer
	D90	µm	17.0 – 24.0	Malvern Mastersizer 2000 Laser Particle Size Analyzer
Moisture Content	Water Content	%	≤ 0.2	Precision Moisture Meter Analyzer
Carbon Purity (C)	Total Carbon	%	≥ 99.9	Sartorius KSW-Heat Oven / Gravimetric Analysis
Specific Surface Area (SSA)	BET Surface Area	m²/g	1.0 – 2.5	BET Nitrogen Adsorption Testing Instrument
Tap Density (TAP)	Volumetric Density	g/ml	1.10 – 1.30	Automated Mechanical Tap Density Instrument
Electrochemical Capacity	1st Discharge Capacity	mAh/g	≥ 330	CR2032 Half-Cell Coin Test (0.1C vs. Li/Li+)
Electrochemical Efficiency	1st Coulombic Efficiency	%	≥ 93	CR2032 Half-Cell Coin Test (0.1C vs. Li/Li+)
Trace Metal Contaminants	Iron (Fe)	ppm	≤ 50	Inductively Coupled Plasma (ICP) Optical Emission Spectrometry

Lithium Rich Manganese Based Cathode Material For Lithium Ion Batteries

Item Number: CL14

Introduction

Discover high performance lithium rich manganese based cathode material for advanced lithium ion batteries offering specific capacity over 250 mAh per g, superior structural stability, low raw material cost, and exceptional rate capability across coin and pouch cell research configurations.

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Application	Description	Key Benefit
Electric Vehicle (EV) Battery R&D	Formulating next-generation traction cells demanding ultra-high gravimetric energy density exceeding conventional ternary limitations.	Significantly increases driving range per pack while reducing dependence on expensive cobalt and nickel resources.
Grid Energy Storage Systems (ESS)	Developing large-format storage cells where raw material abundance, cyclic stability, and cost per kilowatt-hour are paramount metrics.	Delivers a cost-effective, high-capacity cathode matrix with intrinsic thermal resilience and high safety margins.
Industrial Power Tools	Engineering high-drain power tool battery packs operating under rapid discharge and fluctuating thermal loads.	Maintains structural integrity and sustained power output under aggressive rate cycling up to 3C.
Consumer Electronics & Tablets	Designing slim-form-factor pouch cells for smart devices, tablets, and wearable electronics requiring maximum single-charge runtimes.	Provides high volumetric density and thin coating compatibility to fit constrained internal hardware spaces.
Laboratory Academic Research	Conducting fundamental electrochemical characterization in CR2032/CR2016 coin cells and multi-layer experimental pouch cells.	Yields reproducible data across standardized testing protocols with minimal baseline batch variability.
Electronic Toys & Smart Hardware	Integrating reliable power sources into consumer robotics, RC equipment, and connected smart consumer hardware.	Combines high volumetric energy density with cost-competitive material economics for mass-market deployment.

Parameter Category	Specification Metric	Value (Item: CL14)
Model Identification	Product Code	CL14
Physical Properties	Particle Size D10	4.90 µm
	Particle Size D50	9.40 µm
	Particle Size D90	16.8 µm
	BET Specific Surface Area	0.70 m^2/g
	Tap Density	2.00 g/cm^3
	pH Value	10.86
Chemical Composition & Impurities	Iron (Fe) Content	~0.0032%
	Copper (Cu) Content	~0.0000%
	Magnesium (Mg) Content	~0.0129%
	Gallium (Ga) Content	~0.0099%
	Moisture (H2O) Content	~0.0335%

Parameter Category	Specification Metric	Value (Item: CL14)
Electrochemical Characteristics	Nominal Operating Voltage	3.0 V – 4.6 V (Extended: 2.0 V – 4.8 V)
	Specific Discharge Capacity (0.1C, 3.0–4.6V)	≥200 mAh/g (Coin Cell, 25°C)
	High-Voltage Specific Capacity (2.0–4.8V)	>250 mAh/g
Standard Test Conditions	Coin Cell Capacity Benchmark	25°C, 0.1C constant current discharge, 3.0 V to 4.6 V
	C-Rate Evaluation Protocol	Charge: 25°C, 0.5C CC to 4.8V, CV to <0.02C; Discharge: 0.1C, 0.2C, 0.5C, 1.0C, 2.0C, 3.0C CC to 3.0V
	Cycle Life Evaluation Protocol	Charge: 25°C, 0.5C CC to 4.8V, CV to <0.02C; Discharge: 1.0C CC to 3.0V
Packaging & Form Factor	Available Packaging Options	20 g / 100 g / 500 g / 1000 g sealed protective bottles

Sodium Ion Battery Cathode Material Sodium Iron Manganese Oxide Powder Na2 3 Fe1 2 Mn1 2 O2

Item Number: CL11

Introduction

High purity P2 type sodium iron manganese oxide cathode powder engineered for advanced sodium ion battery research and cell manufacturing delivering 180 mAh per g specific capacity stable electrochemical kinetics and exceptional batch consistency for energy storage applications.

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Application	Description	Key Benefit
Grid-Scale Energy Storage Systems (BESS)	Large-scale stationary sodium-ion battery modules for renewable energy peak-shaving and backup storage.	Substantially reduces raw material costs by utilizing abundant iron and manganese without compromising operational safety.
Commercial & Academic Battery R&D	Electrochemical evaluation of sodium-ion cathode chemistries, phase transitions, and electrolyte compatibility.	High chemical purity and precise stoichiometry provide reproducible baseline data for academic publications and patents.
Low-Speed Electric Vehicles (LSEVs)	Powering light electric vehicles, e-scooters, and urban transport fleets requiring budget-friendly power units.	Offers balanced energy density and high discharge capability over wide ambient temperature operating ranges.
Stationary Telecommunication Backup Power	Base station reserve power systems subjected to float-charge conditions and deep discharge cycles.	Inherent thermal stability and low-cost profile make it a resilient alternative to traditional lead-acid and LFP systems.
Electrolyte & Additive Evaluation Platforms	Testing novel non-aqueous electrolytes, ionic liquids, and solid-state conductors against high-voltage layered cathodes.	Well-defined 1.5 V to 4.0 V redox activity enables clear monitoring of SEI/CEI formation and interfacial impedance evolution.
Pilot-Scale Pouch & Cylindrical Cell Fabrication	Scaled electrode slurry mixing, coating, and roll-to-roll pressing for prototype cell assembly lines.	Fine particle size (≤3 μm) enables uniform current collector coating with excellent binder-conductive agent cohesion.

Parameter Category	Specification Parameter	Value / Metric (CL11)
Identification	Product Item Number	CL11
Chemical Properties	Material Name	Sodium Iron Manganese Oxide Powder
Chemical Properties	Chemical Formula	Na2/3(Fe1/2Mn1/2)O2
Chemical Properties	Molar Stoichiometry Ratio (Na : Fe : Mn : O)	2/3 : 1/2 : 1/2 : 2 (mol)
Chemical Properties	Chemical Purity (wt%)	≥ 99.9% (3N Grade)
Physical Properties	Crystal Phase Structure	P2-type Layered Structure
Physical Properties	Powder Appearance / Color	Black Powder
Physical Properties	Primary Particle Size (D50/Primary)	≤ 3 μm
Electrochemical Data	Specific Discharge Capacity (0.1C)	180 mAh/g
Electrochemical Data	Operating Voltage Window	1.5 V – 4.0 V (vs. Na/Na^+)
Electrochemical Data	Initial Cycle Retention (20 Cycles)	70%
Trace Impurity Limits	Copper (Cu)	≤ 12 ppm
Trace Impurity Limits	Nickel (Ni)	≤ 35 ppm

Parameter Category	Specification Parameter	Value / Metric (CL11)
Trace Impurity Limits	Cobalt (Co)	≤ 30 ppm
Trace Impurity Limits	Calcium (Ca)	≤ 7 ppm
Trace Impurity Limits	Potassium (K)	≤ 15 ppm
Trace Impurity Limits	Magnesium (Mg)	≤ 20 ppm
Trace Impurity Limits	Silicon (Si)	≤ 18 ppm
Trace Impurity Limits	Aluminum (Al)	≤ 25 ppm
Trace Impurity Limits	Zirconium (Zr)	≤ 15 ppm

Lithium Ion Battery Cathode Material Lithium Manganese Oxide Lmo Limn2O4 Powder

Item Number: CL17

Introduction

High-purity spinel lithium manganese oxide LMO LiMn2O4 cathode powder delivers superior thermal stability, low internal impedance, and exceptional rate capability for advanced lithium ion battery cell prototyping, coin cell fabrication, electrochemical research, and high-power energy storage systems.

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Application	Description	Key Benefit
High-Power Lithium-Ion Battery Prototyping	Fabrication of cylindrical (18650/21700) and pouch cells targeting power tools, uninterruptible power supplies (UPS), and engine starting systems.	Minimizes area-specific impedance (ASI) and limits operational heat generation during rapid charge and discharge pulses.
Electrochemical R&D and Coin Cell Testing	Material benchmarking in CR2032/CR2016 half-cell and full-cell formats for academic research and industrial electrolyte formulation studies.	Delivers highly reproducible voltage plateaus (~4.0 V vs. Li/Li^+) and consistent discharge capacities for baseline data comparison.
LMO-LTO High-Safety Energy Storage Systems	Pairing with lithium titanate (Li4Ti5O12) anodes to create heavy-duty, ultra-long-life cells for grid frequency regulation and electric drives.	Drastically reduces thermal runaway risks, eliminates active battery cooling requirements, and achieves 97–98% high-power energy efficiency.
Cathode Blending and Composition Optimization	Blending with high-nickel ternary oxides (NMC/NCA) or lithium iron phosphate (LFP) to tune thermal stability, cost efficiency, and voltage profiles.	Enhances overall pack safety margins, suppresses high-temperature oxygen release, and reduces raw material costs without compromising voltage.
Electrode Slurry Coating and Calendering Process Validation	Optimization of continuous roll-to-roll doctor-blade coating, slot-die extrusion, and precision calendering parameters on commercial aluminum foils.	Consistent particle sphericity and mechanical strength prevent foil wrinkling and particle crushing during high-pressure electrode densification.
Elevated Temperature Cycle Life Analysis	Studying structural phase transformations, Jahn-Teller distortion phenomena, and manganese ion dissolution mitigation strategies at 45°C to 55°C.	Predictable spinel crystal lattice parameters enable precise evaluation of surface coatings, atomic doping, and functional electrolyte additives.

Classification	Parameter / Test Item	Technical Specification	Typical Value	Unit	Test Method / Conditions
Model Identification	Product Model Number	CL17	CL17	—	Manufacturer Standard
Packaging	Standard Net Weight	100, 500, 1000	100, 500, 1000	g/bag	Sealed Moisture-Barrier Foil Bag
Chemical Composition	Lithium (Li) Content	4.0 ± 0.5	4.0	%	ICP-OES / Potentiometric Titration
Chemical Composition	Manganese (Mn) Content	59.5 ± 0.5	59.6	%	ICP-OES / Potentiometric Titration
Trace Impurities	Iron (Fe)	< 100	20	ppm	Inductively Coupled Plasma (ICP)
Trace Impurities	Potassium (K)	< 200	85	ppm	Inductively Coupled Plasma (ICP)
Trace Impurities	Sodium (Na)	< 4000	2350	ppm	Inductively Coupled Plasma (ICP)
Trace Impurities	Calcium (Ca)	< 250	145	ppm	Inductively Coupled Plasma (ICP)

Classification	Parameter / TestItem	Technical Specification	Typical Value	Unit	Test Method / Conditions
Trace Impurities	Copper (Cu)	< 50	1	ppm	Inductively Coupled Plasma (ICP)
Trace Impurities	Magnetic Impurities	< 8	5.4	ppm	ICP-OES (Without Ultrasonication)
Physical Properties	Appearance	Uniform black powder, no agglomeration, no foreign inclusions	Conforms	—	Visual Inspection
Physical Properties	pH Value	8.0 – 10.0	8.9	—	pH Meter (5g powder in 50ml 25°C pure water, stirred 1 min)
Physical Properties	Water / Moisture Content	< 1000	400	ppm	Karl Fischer Coulometric Titration
Physical Properties	Tap Density	1.8 – 2.3	2.0	g/cm³	Automated Tap Density Analyzer
Particle Size Distribution	D10	> 3.5	4.897	µm	Laser Particle Size Analyzer (MasterSizer 2000)
Particle Size Distribution	D50	13.0 – 18.0	14.305	µm	Laser Particle Size Analyzer (MasterSizer 2000)
Particle Size Distribution	D90	< 40.0	28.891	µm	Laser Particle Size Analyzer (MasterSizer 2000)
Specific Surface Area	BET Surface Area	0.4 – 1.0	0.76	m²/g	BET Nitrogen Adsorption Surface Area Analyzer
Electrochemical Metrics	0.1C Discharge Specific Capacity	> 117	121	mAh/g	Coin Cell: 0.1C CC/CV charge to 4.3V (0.02C cutoff), 0.1C discharge to 3.0V
Slurry Formulation Reference	Cathode Mass Ratio	93 : 3.5 : 3.5	93 : 3.5 : 3.5	wt%	Active Material (CL17) : Super P (SP) : PVDF
Cell Fabrication Reference	Cathode Areal Density	39 – 41	40	mg/cm²	Double-sided or single-sided coating baseline
Cell Fabrication Reference	Current Collector Thickness	16	16	µm	Battery-Grade Aluminum Foil
Cell Fabrication Reference	Anode Chemistry & N/P Ratio	Artificial Graphite / 1.07 – 1.10	Conforms	—	Balanced against active cathode loading
Cell Fabrication Reference	Electrolyte Filling Ratio	3.85	3.85	g/Ah	Standard LiPF6 organic carbonate formulation
Full Cell Performance	Operating Voltage & Current	3.0 – 4.2	3.0 – 4.2	V	Constant Current Charge/Discharge: 0.5C Rate
Full Cell Performance	0.5C Discharge Capacity	107 – 109	108	mAh/g	Full-cell testing configuration
Electrode Compacting	Ultimate Compacted Density	2.80 – 2.90	2.85	g/cm³	Optical bend inspection (fold test method)*
Electrode Compacting	Design Mid-Limit Density	2.70	2.70	g/cm³	Target production calendering density
Cycle Durability	Capacity Retention @ RT	> 75	> 78	%	300 cycles @ 0.5C charge/discharge at room temperature
Storage Conditions	Shelf Life & Environment	2 Years (≤45°C, ≤90% RH)	Conforms	—	Sealed inert atmosphere / dry storage

Lithium Battery Cathode Material Lithium Iron Phosphate Lifepo4 Powder Lfp

Item Number: CL06

Introduction

Premium lithium battery cathode material lithium iron phosphate LiFePO4 powder LFP delivers superior thermal safety high discharge capacity low moisture and consistent electrochemical stability for advanced energy storage pouch cell fabrication and coin cell battery research testing workflows

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Application	Description	Key Benefit
Stationary Energy Storage Systems (ESS)	Grid-scale and residential energy storage cells requiring prolonged operational lifespans and deep discharge cycles.	Exceptional cycle life exceeding thousands of cycles with minimal capacity fade and intrinsic structural safety.
Electric Commercial Vehicles and E-Mobility	Heavy-duty electric buses, delivery fleets, and light electric vehicles operating under variable ambient temperatures.	Thermal stability above 600°C that mitigates runaway hazards while lowering raw material costs compared to cobalt-based chemistries.
Coin Cell R&D and Academic Materials Science	High-throughput electrochemical screening, half-cell evaluation, and novel electrolyte/separator testing in research laboratories.	High batch-to-batch repeatability and predictable first-cycle Coulombic efficiency for rigorous baseline benchmarking.
Pouch Cell Pilot Line Manufacturing	Pilot-scale electrode preparation, automated slurry coating, continuous roll calendering, and cell assembly verification.	Pre-conditioned, low-moisture powder enables direct slurry mixing without slurry gelation or pinhole coating defects.
High-Rate Pulse Power Devices	Power tools, uninterrupted power supply (UPS) units, and marine starter batteries requiring high current delivery.	Carbon-coated nanostructure facilitates low internal resistance and fast lithium intercalation dynamics.
Hybrid and Solid-State Battery Development	Next-generation solid-state and semi-solid electrolyte interface studies requiring stable, non-reactive cathode surfaces.	Stable olivine framework prevents transition metal dissolution and minimizes interface impedance degradation.

Parameter	Unit	Variant CL06-01	Variant CL06-02	Variant CL06-03	Test Method / Instrumentation
Appearance	—	Gray-black powder, uniform color, no hard agglomeration	Gray-black powder, no agglomeration	Gray-black powder, no agglomeration	Visual Inspection
First Discharge Capacity (0.1C)	mAh/g	≥ 150.0	—	—	Coin half-cell (vs. Li/Li+)
First Charge Capacity (0.1C)	mAh/g	≥ 154.0	≥ 150.0	≥ 154.0 (Tested: 156.3)	Coin half-cell (vs. Li/Li+)
First Cycle Efficiency (0.1C)	%	≥ 95.0	≥ 90.0	≥ 95.0 (Tested: 97.62)	Coin half-cell ratio
Bulk Density	g/cm³	≥ 0.30	—	—	BT-303 Tap Density Analyzer
Tap Density	g/cm³	≥ 0.80	1.0 ± 0.2	0.8 ± 0.2 (Tested: 0.710)	Tap Density Analyzer
Specific Surface Area (SSA)	m²/g	10.0 ± 1.5	13.0 ± 2.0	12.0 ± 2.0 (Tested: 11.395)	BET Dynamic Adsorption / TriStar II 3020
Electrical Resistivity	Ω·cm	—	—	≤ 100 (Tested: 6.934)	Mitsubishi Powder Resistivity Meter
Moisture Content	ppm	≤ 1000	< 1500	< 1000 (Tested: 667.1)	Karl Fischer Coulometry (200°C heating)

Parameter	Unit	Variant CL06-01	Variant CL06-02	Variant CL06-03	Test Method / Instrumentation
Slurry pH Value	—	8.0 ~ 10.0	—	9.5 ± 1.0 (Tested: 9.20)	pH Meter (10 g LFP in 90 g CO_2-free water)
Microstructure	—	Uniform Morphology	Uniform Morphology	Uniform Morphology	Scanning Electron Microscopy (SEM)

Particle Metric	Unit	Variant CL06-01	Variant CL06-02	Variant CL06-03	Test Conditions
D10	μm	≥ 0.35	< 1.5	≥ 0.25 (Tested: 0.419)	Aqueous dispersion, Malvern Mastersizer 2000
D50	μm	0.6 ~ 1.8	4.0 ± 2.0	1.3 ± 0.5 (Tested: 1.070)	Aqueous dispersion, Malvern Mastersizer 2000
D90	μm	≤ 4.50	< 10.0	< 10.0 (Tested: 2.750)	Aqueous dispersion, Malvern Mastersizer 2000
D97	μm	≤ 7.50	—	—	Aqueous dispersion, Malvern Mastersizer 2000

Element	Unit	Specification (CL06-01)	Specification (CL06-03)	Analytical Test Method
Lithium (Li)	wt%	4.3 ± 0.3	—	Inductively Coupled Plasma (ICP-OES)
Iron (Fe)	wt%	34.5 ± 1.0	—	Inductively Coupled Plasma (ICP-OES)
Phosphorus (P)	wt%	19.5 ± 1.0	—	Inductively Coupled Plasma (ICP-OES)
Carbon (C)	wt%	1.0 ~ 1.5	1.45 ± 0.2 (Tested: 1.42)	High-Frequency Infrared Carbon-Sulfur Analyzer

Impurity Metal	Max Threshold (wt%)	Typical Detection Method
Calcium (Ca)	≤ 0.030% (300 ppm)	Agilent 710 ICP-OES
Sodium (Na)	≤ 0.030% (300 ppm)	Agilent 710 ICP-OES
Magnesium (Mg)	≤ 0.030% (300 ppm)	Agilent 710 ICP-OES
Chromium (Cr)	≤ 0.015% (150 ppm)	Agilent 710 ICP-OES
Manganese (Mn)	≤ 0.010% (100 ppm)	Agilent 710 ICP-OES
Nickel (Ni)	≤ 0.010% (100 ppm)	Agilent 710 ICP-OES
Copper (Cu)	≤ 0.005% (50 ppm)	Agilent 710 ICP-OES
Zinc (Zn)	≤ 0.005% (50 ppm)	Agilent 710 ICP-OES

Parameter	Standard Details
Standard Packaging Configurations	100 g/bag, 500 g/bag, 1000 g/bag (multi-layer aluminum vacuum-sealed bags)
Pre-Processing Handling	Strict moisture-controlled manufacturing allows direct slurry incorporation without customer pre-baking under standard conditions
Shelf Life	24 Months (2 Years) under unopened, dry, and room-temperature storage conditions
Custom Specification Alignment	Specialized particle size distributions, custom carbon coating percentages, or target tap densities can be negotiated and custom-synthesized upon technical review

High Purity 99.99 Percent Graphite Sheet For Battery Electrodes With Customizable Dimensions

Item Number: CL30

Introduction

Engineered for advanced energy storage and electrochemical research, our 99.99% high-purity graphite sheet provides superior electrical conductivity, exceptional thermal stability, and customizable dimensions to optimize battery electrode performance and precision laboratory cell prototyping.

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Application	Description	Key Benefit
Battery Electrode Substrates	Serves as a high-conductivity current collector or conductive backing plate in pouch cells, test fixtures, and custom battery configurations.	Minimizes internal cell resistance and eliminates parasitic chemical contamination.
Solid-State Battery R&D	Used as rigid conductive backing plates in specialized high-pressure solid-state electrolyte testing cells and pressing dies.	Withstands mechanical compression while maintaining continuous planar electrical contact.
Supercapacitor Current Collectors	Acts as an inert, high-surface-quality conducting base plate for activated carbon and pseudocapacitive electrode slurries.	Facilitates ultra-fast charge transfer kinetics and maximizes cycle-life stability.
Electrochemical Corrosion Cells	Applied as an inert auxiliary or counter electrode in standard three-electrode analytical setups and flow cells.	Resists aggressive electrolyte oxidation and provides stable reference conditions.
Fuel Cell Bipolar Component Prototyping	Provides conductive, gas-impermeable plate stock for machining micro-flow channels in proton-exchange membrane (PEM) and direct methanol fuel cells.	Combines high in-plane electrical conductivity with reliable acid corrosion resistance.
High-Temperature Thermal Management	Deployed as thermal spreaders and heat sink pads in vacuum furnaces, semiconductor test fixtures, and high-flux electronic modules.	Rapidly dissipates concentrated thermal loads without dimensional warping or mechanical fatigue.
Electrolytic Synthesis & Recovery	Utilized as non-consumable conductive plates for metal electrodeposition, wastewater electro-oxidation, and chemical electrosynthesis.	Extends operational lifetime under continuous high current density and harsh pH regimes.
Precision Sintering & Metallurgy Fixtures	Serves as non-reactive, heat-resistant support trays and spacers during vacuum sintering of advanced ceramics and metal powders.	Prevents molten alloy or ceramic adhesion at extreme processing temperatures.

Specification Parameter	CL30 Baseline Configuration	Available Dimensional Variants
Material Purity	99.99% Carbon (C)	99.99% Carbon (C) across all sizes
Standard Packaging	5 pcs / bag	5 pcs / bag (protective sealed packaging)
Base Model Dimensions (L × W × T)	100 × 50 × 2 mm	Full catalog matrix detailed below
100 mm Series (50 mm Width)	100 × 50 × 2 mm	100 × 50 × 3 mm, 100 × 50 × 5 mm, 100 × 50 × 10 mm
100 mm Series (100 mm Width - Thin)	100 × 100 × 1 mm	100 × 100 × 2 mm, 100 × 100 × 3 mm, 100 × 100 × 4 mm, 100 × 100 × 5 mm
100 mm Series (100 mm Width - Mid)	100 × 100 × 6 mm	100 × 100 × 8 mm, 100 × 100 × 10 mm, 100 × 100 × 15 mm, 100 × 100 × 20 mm
100 mm Series (100 mm Width - Thick)	100 × 100 × 25 mm	100 × 100 × 30 mm, 100 × 100 × 35 mm, 100 × 100 × 40 mm, 100 × 100 × 45 mm, 100 × 100 × 50 mm
200 mm Series (100 mm Width)	200 × 100 × 5 mm	200 × 100 × 10 mm

Specification Parameter	CL30 Baseline Configuration	Available Dimensional Variants
200 mm Series (150 mm Width)	200 × 150 × 3 mm	200 × 150 × 5 mm, 200 × 150 × 10 mm
250 mm Series (200 mm Width)	250 × 200 × 10 mm	Fully custom length/width cuts available upon request
300 mm Series (200 mm Width - Thin)	300 × 200 × 2 mm	300 × 200 × 3 mm, 300 × 200 × 4 mm, 300 × 200 × 5 mm, 300 × 200 × 6 mm
300 mm Series (200 mm Width - Mid)	300 × 200 × 8 mm	300 × 200 × 10 mm, 300 × 200 × 15 mm, 300 × 200 × 20 mm
300 mm Series (200 mm Width - Heavy)	300 × 200 × 30 mm	300 × 200 × 40 mm
400 mm Series (200 & 400 mm Width)	400 × 200 × 10 mm	400 × 400 × 5 mm, 400 × 400 × 10 mm
Customization Capability	Standard rectangular sheet	Custom thickness slicing, CNC profile routing, hole drilling, and surface lapping

Lithium Rich Cathode Lithium Compensation Additive Lno Lfo Powder For Ncm Nca Lfp Lithium Ion Batteries

Item Number: CL07

Introduction

High performance lithium rich cathode lithium compensation additives including LNO and LFO powders engineered to dramatically improve first cycle coulombic efficiency offset initial capacity loss and extend cycling stability across high energy density NCM NCA and LFP battery chemistries

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Application	Description	Key Benefit
Silicon-Carbon (Si-C) Anode Battery Cells	Integrated into NCM/NCA cathodes paired with high-expansion Si-C anodes to supply sacrificial lithium during initial SEI formation.	Overcomes severe first-cycle irreversible capacity loss, increasing total usable cell energy density by up to 15%.
High-Capacity NCM & NCA Ternary Cells	Mixed into high-nickel ternary cathode formulations during slurry preparation for automotive pouch, prismatic, and cylindrical cells.	Increases initial coulombic efficiency (ICE) and improves capacity retention during high-rate and elevated-temperature cycling.
Lithium Iron Phosphate (LFP) Systems	Utilized alongside iron-based cathode materials (LFO variants) to supplement active lithium in energy-dense LFP cell designs.	Enhances discharge capacity retention over thousands of extended charge-discharge cycles in stationary energy storage systems.
Solid-State Battery Formulations	Employed as a active lithium source in all-solid-state lithium cell R&D to compensate for solid-solid interface lithium consumption.	Maintains solid electrolyte interface conductivity and prevents rapid capacity degradation in solid-state architectures.
Extreme Fast-Charging (XFC) Batteries	Applied in cells optimized for rapid charging profiles where aggressive SEI growth accelerates early active lithium depletion.	Stabilizes long-term capacity retention under high-current pulse regimes and prevents lithium inventory exhaustion.
Advanced Battery Materials Research	Used in university and corporate laboratory research for precise stoichiometry control and pre-lithiation studies.	Provides reproducible, reliable lithium pre-doping metrics for novel cathode alloy development and testing.

Specification Parameter	CL07-LNO (Li2NiO2 Grade)	CL07-LFO (Li5FeO4 Grade)
Chemical Formula	Li2NiO2	Li5FeO4
Target Cathode Compatibility	NCM, NCA Ternary Systems	LFP, Ternary Cathode Systems
Theoretical Lithium Specific Capacity	486 mAh/g	867 mAh/g
Reversible Specific Capacity	~90 mAh/g	~0 mAh/g (above 2.7V)
Primary Decomposition Voltage Window	3.5 V – 4.5 V	3.5 V – 4.0 V (Phase 1), 4.0 V (Phase 2)
Particle Size Distribution (D10)	< 5.0 µm	Tailored / Sub-micron options
Particle Size Distribution (D50)	10.0 µm – 15.0 µm (Customizable)	Uniform morphology
Particle Size Distribution (D90)	< 30.0 µm	Uniform morphology
Residual Lithium Hydroxide (LiOH)	< 3.0 wt%	Low residual alkali control
Residual Lithium Carbonate (Li2CO3)	< 1.0 wt%	Ultra-low carbon impurity
Synthesis Process Route	Mixing -> Precursor -> Sintering -> Crushing/Sieving/Demagnetization	One-step calcination sintering
Cycle Retention (25°C, 0.5C/1C @ 400 Cycles)	Standard: 72.39% | +3% Additive: 85.02% (+15.50% boost)	Enhanced cycling stability
Cycle Retention (45°C, 0.5C/1C @ 300 Cycles)	Standard: 84.98% | +3% Additive: 88.44% (+5.09% boost)	Superior high-temp stability

Specification Parameter	CL07-LNO (Li2NiO2 Grade)	CL07-LFO (Li5FeO4 Grade)
Demagnetization / Magnetic Impurity Removal	Included in final processing stage	Included in final processing stage

Polyvinylidene Fluoride Pvdf Powder Lithium Battery Cathode Binder

Item Number: CL33

Introduction

Premium polyvinylidene fluoride PVDF powder optimized for lithium battery cathode binder applications, offering exceptional chemical inertness, high mechanical adhesion, minimal moisture absorption, robust thermal resistance, and consistent dispersion performance across advanced energy storage research and commercial cell manufacturing workflows.

Learn More

Application	Description	Key Benefit
Lithium-Ion Cathode Slurry Preparation	Dissolved in NMP and blended with LiFePO4, NMC, LCO, or NCA active materials and conductive carbon black to form homogeneous coating slurries.	Prevents slurry phase separation and ensures uniform active mass loading across metallic current collector substrates.
High-Rate Cell Electrode Calendering	Used in high-power cylindrical, prismatic, and pouch cell electrodes subjected to intense mechanical roll-pressing and compaction forces.	Mitigates microcracking and foil delamination during high-density calendering, preserving electrode microstructure.
Solid-State Battery Composite Cathodes	Serves as a polymeric structural matrix holding solid electrolyte particles and high-capacity cathode chemistries in continuous contact.	Accommodates mechanical stress and volumetric changes while sustaining intimate particle-to-particle ionic transport pathways.
Electrospun Polymeric Separator R&D	Processed via electrospinning or phase inversion to generate porous non-woven membranes and separator coating layers.	Delivers superior chemical resistance to organic solvents, high electrolyte wettability, and robust thermal shrinkage resistance.
Silicon-Graphite Anode Matrix Modification	Blended into hybrid anode formulations to provide an elastic, electrochemically stable fluoropolymer binding network.	Assists in dampening the extreme mechanical stress and delamination forces associated with silicon particle lithiation expansion.
Supercapacitor & Pseudocapacitor Electrodes	Binds activated carbon, transition metal oxides, and MXenes to nickel foam or etched aluminum substrates for rapid energy discharge.	Ensures stable low-impedance electrical contact without degrading under rapid electrostatic cycling and high current densities.

Parameter Category	Specification Parameter	Test Standard / Condition	Value / Unit
Product Identification	Base Product Identifier	-	CL33
Packaging Options	Net Weight per Pack	Sealed Moisture-Barrier Packaging	100 g / pack, 500 g / pack
Physical Properties	Density	ISO 1183	1.78 g/cm³
	Water Absorption	ISO 62 (Method 1, 24 h at 23°C)	< 0.04%
	Melt Flow Index (MFI)	ASTM D 1238 (230°C, 21.6 kg)	1.3 g/10 min
Thermal Properties	Thermal Stability (1% Weight Loss)	TGA in Air	375 – 400 °C (707 – 752 °F)
	Linear Thermal Expansion Coefficient	ASTM D 696	120 – 140 × 10^{-6} K^{-1}
	Thermal Conductance	ASTM C 177 (at 23°C)	0.2 W/(m·K)
	Specific Heat Capacity	At 23°C & 100°C	1.2 – 1.6 J/(g·K)
Electrical Properties	Surface Resistivity	ASTM D 257 / DIN 53483 (Voltage <1 V, after 2 s -500 V, 23°C)	1 × 10^{14} Ω/sq

Parameter Category	Specification Parameter	Test Standard / Condition	Value / Unit
	Volume Resistivity	ASTM D 257 / DIN 53483 (Intensity = 10 mA, after 2 s, 23°C)	1×10^{14} Ω·cm
Fire Resistance	Flammability Classification	UL-94	Compliant Standard Class
	Limiting Oxygen Index (LOI)	ASTM D 2863 (Sheet thickness 3 mm)	44%

Sodium Ion Battery Prussian Blue Cathode Material High Capacity Active Powder

Item Number: CL09

Introduction

High performance sodium ion battery prussian blue cathode material offering Na2FeFe(CN)6 chemistry, rapid Na ion diffusion, low lattice strain, and discharge capacity above 100 mAh per gram for advanced battery research and full cell testing workflows.

Learn More

Application	Description	Key Benefit
Sodium-Ion Full-Cell Fabrication	Used as the primary positive electrode active material paired against hard carbon or alloy anodes in coin and pouch cells.	Eliminates pre-sodiumation steps due to pristine Na-rich state, streamlining cell production workflows.
Fast-Charging Battery Research	Formulated into low-impedance composite electrodes to test high-rate capability and low internal resistance.	Large lattice channels allow fast Na+ transport, maintaining capacity under high C-rate cycling.
Low-Temperature Battery Prototyping	Evaluated in low-temperature electrolytes for energy storage operating under extreme environmental conditions.	Low activation energy for Na+ insertion minimizes capacity drop-off in cold ambient settings.
Electrode Rheology & Process Development	Utilized in pilot line mixing, coating, and roll-pressing optimization studies to establish baseline electrode densities.	Stable particle distribution and moderate surface area simplify slurry formulation and calendering.
Grid-Scale Energy Storage Evaluation	Integrated into long-cycle life research cells aiming for low-cost, cobalt-free grid-scale storage solutions.	Earth-abundant iron and carbon building blocks drastically lower active material cost per kWh.

Parameter	Specification / Value
Product Item Number	CL09
Material Classification	Sodium-Ion Battery Prussian Blue Cathode Powder
Chemical Formula	Na2FeFe(CN)6
Physical Appearance	Light Blue Powder
Particle Size Distribution (D10)	8.9 µm
Particle Size Distribution (D50)	21 µm
Particle Size Distribution (D90)	40.5 µm
Specific Surface Area (BET)	≤ 25 m²/g
Material pH	8.19
First Discharge Specific Capacity	≥ 100 mAh/g (Na half-cell, 0.1C rate, 2.0V–3.8V window)
Hygroscopic Properties	Hydrophilic; readily absorbs ambient moisture
Storage & Handling Recommendations	Store at room temperature in sealed, moisture-proof packaging. Open container under dry room conditions and consume promptly, or store within an inert atmosphere glove box.
Transport & Packaging Safety	Non-flammable, non-hazardous cargo under intact packaging conditions

Linicomno2 Ni Co Mn 8 1 1 Ncm 811 Cathode Material Lithium Ion Battery High Nickel Ternary Nmc

Item Number: CL04

Introduction

High nickel NCM 811 LiNiCoMnO2 cathode material delivering exceptional energy density high specific capacity and superior cycle stability for next generation lithium ion battery cell research and development across commercial pouch cylindrical and prismatic formats.

Learn More

Application	Description	Key Benefit
Electric Vehicle (EV) Traction Batteries	Active cathode active material for high-capacity NMC 811 automotive pouch and prismatic cells.	Maximizes gravimetric energy density to extend driving range while maintaining robust cycle life.
Solid-State Battery Research	Integration into sulfide- and oxide-based solid-state lithium battery architectures.	High structural stability and low surface reactivity reduce interphase resistance with solid electrolytes.
Aerospace and Drone Power Systems	Lightweight, high-discharge battery packs requiring maximum energy-to-weight ratios.	High specific capacity (>210 mAh/g) reduces total pack weight without sacrificing power output.
Consumer Electronics (3C Devices)	Thin-profile pouch cells for premium laptops, smartphones, and wearable electronic devices.	High compacted density ($\ge 3.2\text{ g/cm}^3$) maximizes volumetric capacity in ultra-compact form factors.
Grid and Industrial Energy Storage	Utility-scale energy storage systems subject to rigorous daily cycling protocols.	High capacity retention (>91% at room temperature after 50 cycles) ensures long operational life.
Academic and Industrial Battery R&D	Standardized positive electrode reference material for half-cell and full-cell coin/pouch testing.	High batch-to-batch consistency enables reproducible electrochemical benchmarking and binder evaluation.
High-Rate Discharge Equipment	Power tools, robotic manipulators, and medical equipment requiring fast C-rate capability.	Stable rate performance across 0.1C to 2C continuous discharge regimes with minimal polarization.

Parameter	Value / Standard
Product Item Number	CL04
Chemical Formula	$LiNi_{0.8}Co_{0.1}Mn_{0.1}O_2$ (NCM 811 / NMC 811)
Available Structural Variants	Single Crystal Ni83 (CL04-M2S) / Polycrystalline Standard (CL04-M2C)
Standard Packaging	500 g / sealed vacuum aluminum foil bag

Inspection Parameter	Unit	Variant CL04-M2S (Single Crystal Ni83)	Variant CL04-M2C (Polycrystalline)	Testing Method / Instrument
Particle Size Distribution D10	μm	—	5.0 ± 1.0	Laser Diffraction (Mastersizer 2000)
Particle Size Distribution D50	μm	4.0 ± 1.0 (Typical: 3.6)	10.0 ± 2.0	Laser Diffraction (Mastersizer 2000)
Particle Size Distribution D90	μm	—	20.0 ± 4.0	Laser Diffraction (Mastersizer 2000)
Maximum Particle Size (Dmax)	μm	—	≤ 40.0	Laser Diffraction (Mastersizer 2000)
Specific Surface Area (SSA)	m^2/g	0.6 ± 0.2 (Typical: 0.65)	0.6 ± 0.3	BET Nitrogen Adsorption (TriStar 3000)

Inspection Parameter	Unit	Variant CL04-M2S (Single Crystal Ni83)	Variant CL04-M2C (Polycrystalline)	Testing Method / Instrument
Tap Density	g/cm^3	—	≥ 2.1	Tap Density Meter
Powder Compacted Density	g/cm^3	—	≥ 3.2	Hydraulic Powder Press
Moisture Content	ppm	—	≤ 600	Karl Fischer Coulometer @ 250°C (Metrohm 831/860)
pH Value	—	≤ 11.70 (Typical: 11.50)	≤ 11.80	pH Meter (Mettler Toledo FE30)
Residual Alkali: $LiOH$ / OH^-	$wt%$	≤ 0.30 (Typical: 0.21)	≤ 0.40	Potentiometric Titration (Mettler Toledo G20)
Residual Alkali: Li_2CO_3 / CO_3^{2-}	$wt%$	≤ 0.30 (Typical: 0.09)	≤ 0.30	Potentiometric Titration (Mettler Toledo G20)
Magnetic Impurities ($Fe + Cr$)	ppb	—	≤ 100	ICP-OES (Optima 2100DV)
0.1C Specific Capacity (3.0–4.3V)	mAh/g	210 ± 5 (Typical: 210.2)	≥ 205	CR2016 Coin Half-Cell vs. Li/Li^+
Initial Coulombic Efficiency	$%$	89 ± 1 (Typical: 89.6)	≥ 88	CR2016 Coin Half-Cell (0.1C / 0.1C)

Cycle Step / Rate Protocol	Charge Capacity (mAh/g)	Discharge Capacity (mAh/g)	Coulombic Efficiency ($%)	Capacity Retention ($%)
1st Cycle (0.1C / 0.1C)	234.5	210.2	89.6	100.0 (Base)
2nd Cycle (0.5C / 0.5C)	—	196.7	—	—
3rd Cycle (0.5C / 1.0C)	—	190.5	—	—
4th Cycle (0.5C / 2.0C)	—	183.5	—	—
5th Cycle (0.5C / 1.0C)	—	190.2	—	—
55th Cycle (0.5C / 1.0C)	—	174.5	—	91.7 (at 50th Cycle)

Cycle Step / Rate Protocol	Charge Capacity (mAh/g)	Discharge Capacity (mAh/g)	Coulombic Efficiency ($%)	Capacity Retention ($%)
1st Cycle (0.1C / 0.1C)	242.2	222.2	91.7	100.0 (Base)
2nd Cycle (0.5C / 0.5C)	—	213.8	—	—
3rd Cycle (0.5C / 1.0C)	—	208.1	—	—
4th Cycle (0.5C / 2.0C)	—	201.6	—	—
5th Cycle (0.5C / 1.0C)	—	206.3	—	—
55th Cycle (0.5C / 1.0C)	—	191.9	—	93.0 (at 50th Cycle)

High Purity Acetylene Black Battery Conductive Agent Powder For Energy Storage And Polymer Applications

Item Number: CL25

Introduction

Engineered for advanced energy storage and conductive polymer systems, this ultra-pure acetylene black delivers superior electrical conductivity, exceptional liquid absorption, and minimal impurity levels, ensuring lower cell internal resistance and highly stable electrochemical performance across demanding electrode fabrication processes.

Learn More

Application	Description	Key Benefit
Lithium-Ion Battery Cathodes	Blended with metal oxide active chemistries (such as LFP, NMC, and LCO) during slurry preparation to build three-dimensional conductive networks.	Decreases internal cell resistance (IR), improves rate capability, and maximizes active material electrochemical utilization.
Primary Dry Cell Batteries	Incorporated into cathode depolarizer mixtures in conventional zinc-carbon and alkaline battery architectures.	Enhances continuous discharge efficiency, maintains uniform current collection, and extends shelf life.
Conductive Polymers & Masterbatches	Compounded into thermoplastics and engineering resins to impart controlled volume resistivity and static dissipative properties.	Achieves anti-static and semi-conductive performance with low additive loadings, preserving the resin's mechanical ductility.
Shielding & Anti-Static Rubber	Dispersed into synthetic and natural elastomers used for automotive seals, fuel hoses, conveyor belts, and cable jackets.	Eliminates electrostatic discharge risks and provides dependable electromagnetic interference (EMI) attenuation.
Radio & Electronic Components	Used in the fabrication of resistive elements, ceramic-carbon composites, and high-frequency electronic attenuators.	Delivers consistent high-frequency signal absorption and long-term ohmic stability under varying ambient conditions.
Specialty Industrial Pigments	Formulated into heavy-duty protective coatings, masterbatches, and industrial inks requiring deep black color.	Offers maximum covering power, neutral optical tone, and permanent resistance to UV radiation, acids, and weathering.

Specification Parameter	Standard Value / Metric	Test / Evaluation Standard
Product Item Number	CL25	Internal Quality Reference
Chemical Abstracts Service (CAS) No.	1333-86-4	Chemical Identity Standard
Physical Appearance	Pure Black Fine Powder / Micro-Granules	Visual Inspection
Specific Resistivity	1.4 Ω·m	Powder Resistivity Method
Iodine Absorption Value	98 mg/g	Standard Volumetric Titration
Acid Absorption Value	4.4 cm^3/g	Liquid Titration Technique
Apparent Specific Volume	16.5 cm^3/g	Volumetric Density Measurement
Statistical Thickness Surface Area (STSA)	106 ± 9 × 10^2 m^2/kg	Nitrogen Adsorption (STSA)
Ash Content	0.06%	High-Temperature Ignition Test
Coarse Particle Residue	0.009%	Sieve Analysis Residue
Heating Loss (Moisture / Volatiles)	≤ 0.08%	Gravimetric Drying Method
pH Value	5.8	Aqueous Slurry Potentiometry

Specification Parameter	Standard Value / Metric	Test / Evaluation Standard
Solubility	Insoluble in water, acids, and alkalis	Chemical Resistance Test
Combustion Characteristics	Burns in air to form Carbon Dioxide (CO_2)	Thermal Oxidation Behavior
Primary Composition	Elemental Carbon (with trace H, O, S, ash, tar, moisture)	Elemental Analysis

Synthetic Graphite Powder Anode Material For High End Lithium Ion Batteries

Item Number: CL28

Introduction

High purity synthetic graphite powder engineered for high end lithium battery anodes delivering first discharge capacity over 360 mAh per g, initial efficiency exceeding 92 percent, tight particle sizing, ultra low moisture, and superior electrochemical cycling stability.

Learn More

Application	Description	Key Benefit
Premium Electric Vehicle (EV) Cells	High-capacity anode formulation for prismatic and pouch format traction battery cells requiring extended range and rapid fast-charging capability.	High initial coulombic efficiency (≥92.0%) and high tap density maximize volumetric energy density and minimize cell mass.
High-Drain Consumer Electronics	Anode active material for ultra-thin pouch and cylindrical cells powering smartphones, high-performance laptops, and portable power tools.	Reversible discharge capacity of ≥360 mAh/g provides long runtime between charges and superior high-rate discharge stability.
Grid Energy Storage Systems (BESS)	Long-life lithium-ion energy storage installations requiring thousands of deep discharge cycles with minimal capacity fade.	Tight d002 interlayer crystalline structure reduces lattice strain during intercalation, ensuring exceptional cycle longevity.
Solid-State & Hybrid Battery R&D	Advanced research substrate for exploring compatibility with solid polymer, sulfide, or oxide electrolytes in next-generation cell chemistries.	Controlled particle size distribution (D50: 18.0–22.0 µm) and low surface area provide clean, reproducible interfacial contact.
Aerospace and Drone Power Packs	Lightweight, high-reliability battery systems operating under demanding discharge rates and strict safety parameters.	Ultra-low metallic contamination (Fe ≤50 ppm) minimizes self-discharge and virtually eliminates the risk of internal short circuits.
High-Consistency Battery Slurry Preparation	Scalable pilot-line and laboratory slurry formulation with standard PVDF or water-based SBR/CMC binder systems.	Uniform particle size distribution ensures smooth dispersion, stable viscosity, and uniform areal mass loading during doctor-blade coating.

Parameter	Specification (CL28)	Measurement Unit	Testing Standard / Notes
Product Item Number	CL28	—	High-End Anode Grade
First Discharge Capacity	≥ 360	mAh/g	Half-cell testing vs. Li/Li+, 0.1C rate
Initial Coulombic Efficiency (ICE)	≥ 92.0	%	First cycle (0.1C charge / 0.1C discharge)
Interlayer Distance (d002)	3.358 ± 0.003	Å	X-ray Diffraction (XRD) analysis
Particle Size Distribution (D10)	8.0 – 12.0	µm	Laser diffraction particle size analyzer
Particle Size Distribution (D50)	18.0 – 22.0	µm	Laser diffraction particle size analyzer
Particle Size Distribution (D90)	35.0 – 41.0	µm	Laser diffraction particle size analyzer
Tap Density (TAP)	≥ 0.80	g/cm³	Mechanical tapped density measurement
Specific Surface Area (SSA)	2.0 – 5.0	m²/g	Multi-point BET nitrogen adsorption
Moisture Content	≤ 0.2	%	Karl Fischer titration / thermogravimetric
Ash Content	≤ 0.1	%	High-temperature furnace combustion residue
Trace Metal Impurity (Fe)	≤ 50	ppm	Inductively Coupled Plasma (ICP-OES)
Standard Packaging	500	g/bag	Sealed aluminum-plastic vacuum barrier bag

High Purity Conductive Graphite Powder For Advanced Battery Electrodes And Energy Storage

Item Number: CL31

Introduction

High purity conductive graphite powder engineered for premium battery electrodes, supercapacitors, and energy storage systems, offering exceptional 99.98% carbon content, ultra-low ash residue, neutral pH, and tightly distributed 1 to 5 micron particle sizing for rigorous research workflows.

Learn More

Application	Description	Key Benefit
Lithium-Ion Battery Cathodes	Serves as an efficient conductive additive blended with LFP, NMC, LCO, or NCA active materials in slurry processing.	Drastically reduces internal cell resistance (DCR), enhances rate capability, and prevents electrode polarization during high C-rate discharge.
Silicon-Graphite Composite Anodes	Incorporated into high-capacity silicon-dominant or silicon-carbon composite negative electrodes.	Maintains continuous electrical contact pathways during the large volumetric expansion and contraction cycles of silicon particles.
Solid-State Battery Electrolyte Interfaces	Formulated into interlayers and composite electrode-electrolyte frameworks for all-solid-state battery cells.	Alleviates interface contact impedance and provides compliant electronic pathways across rigid solid electrolyte interfaces.
Supercapacitor Electrode Formulations	Blended with high-surface-area activated carbons to form high-power density electric double-layer capacitor (EDLC) electrodes.	Imparts rapid electron transport through thick electrode layers, maximizing frequency response and ultra-fast charge/discharge efficiency.
Conductive Inks & Printable Electronics	Compounded into liquid inks and conductive pastes for screen printing, flexographic deposition, and flexible sensor circuits.	Ensures stable sheet resistance, excellent line resolution, and strong adhesion to flexible polymer and metal substrates without corrosion.
Thermal Management & Conductive Polymers	Compounded into engineered thermoplastics, epoxy resins, and thermal interface materials (TIMs).	Imparts both electrical antistatic properties and enhanced directional thermal dissipation pathways in sensitive electronic assemblies.
Electrochemical Sensor Substrates	Applied as the primary conductive foundation or modified modifier layer on working electrodes for analytical detection.	Provides a low background noise signal, a wide electrochemical working potential window, and reproducible electron transfer kinetics.

Parameter	Reference Standard / Value
Product Identifier	CL31
Carbon Content (C)	≥ 99.98 %
Particle Size Distribution (D50 Range)	1 ~ 5 μm
Moisture Content (H_2O)	≤ 0.08 %
Ash Content	≤ 0.01 %
pH Value	7 (Neutral)
Iron Content (Fe)	≤ 5 ppm
Sulfur Content (S)	≤ 0.01 %
Silicon Content (Si)	≤ 1 ppm
Chlorine Content (Cl)	≤ 0.1 ppm

Parameter	Reference Standard / Value
Fluorine Content (F)	≤ 1 ppm
Aluminum Content (Al)	≤ 1 ppm
Copper Content (Cu)	≤ 1 ppm
Chromium Content (Cr)	≤ 1 ppm
Standard Packaging	100 g / sealed bag

Polytetrafluoroethylene Ptfe Battery Binder Powder For Dry Battery Electrode Fabrication And Cathode Assembly

Item Number: CL32

Introduction

Premium polytetrafluoroethylene PTFE battery binder powder engineered for dry electrode manufacturing and silver oxide cathode pelleting, delivering reliable shear fibrillation, uniform 0.47 g/ml bulk density, and superior electrochemical stability to enhance laboratory cell fabrication workflows and active material retention.

Learn More

Application	Description	Key Benefit
Dry Lithium-Ion Electrode Calendering	Solvent-free dry fabrication of high-nickel NMC, LFP, and silicon-graphite composite electrode free-standing films using heated roll presses.	Eliminates solvent drying, prevents active material cracking, and enables ultra-thick electrode coatings with high areal capacity.
Silver Oxide (Ag2O) Cathode Pelleting	Compaction of monovalent silver oxide powder blended with 1% to 5% conductive graphite into positive cell cups under hydraulic pressure.	Delivers structural ductility, prevents pellet crumbling during handling and electrolyte wetting, and ensures consistent pellet packing density.
Solid-State Battery Cathode Composites	Dry blending and shear-forming of solid electrolyte powders (sulfide/oxide) with cathode active materials and conductive additives.	Avoids chemical degradation caused by polar organic solvents while maintaining tight particle-to-particle ionic and electronic contacts.
Electric Double-Layer Capacitor (EDLC) Electrodes	Fabrication of thick, high-surface-area activated carbon electrode sheets supported by a micro-fibrillated fluoropolymer network.	Maintains high open porosity for rapid ion transport while delivering superior mechanical flexibility and peel strength.
Sodium-Ion and Emerging Battery Chemistries	Matrix binding of moisture-sensitive or solvent-reactive sodium cathode compounds into flexible, robust electrode structures.	Provides a non-reactive, water-free binding medium that safeguards moisture-sensitive active materials against premature degradation.
Fuel Cell & Electrolyzer Gas Diffusion Layers	Incorporation into carbon black and catalyst formulations for microporous gas diffusion layers and catalyst-coated membranes.	Imparts controlled hydrophobic properties, mechanical elasticity, and precise gas-permeability channels under compressive cell clamping.

Parameter	Value	Test Standard / Method
Product Item Number	CL32	—
Standard Packaging	1000 g / Pack	Visual / Scale
Visual Appearance	Good (Uniform white powder)	Visual Inspection
Bulk Density	0.47 g/ml	JIS K 6892
Standard Specific Gravity (SSG)	2.160	ASTM D 4895
Average Particle Size	680 µm	JIS K 6891
Extrusion Pressure (RR36)	130 daN	Standard Test Method
Chemical Base	Polytetrafluoroethylene (PTFE)	—
Processing Compatibility	Dry shearing, roll pressing, heated calendering, hydraulic compaction	—

Multilayer Graphene Powder For Lithium Battery Materials And Advanced Energy Storage Conductive Additives

Item Number: CL29

Introduction

Engineered for high-rate lithium battery materials and energy storage applications, this premium multilayer graphene powder provides outstanding electrical conductivity, high specific surface area, and exceptional mechanical reinforcement for superior electrochemical performance across demanding electrode formulations.

Learn More

Application	Description	Key Benefit
Lithium-Ion Cathode Formulations	Incorporated as an advanced conductive additive in high-nickel ternary (NMC/NCA) and lithium iron phosphate (LFP) cathode slurries.	Lowers cathode internal resistance (DCR), improves electron transport across thick electrode coatings, and boosts high-rate C-rate performance.
Silicon-Carbon Composite Anodes	Applied within high-capacity silicon-based and graphite anode blends to accommodate volumetric expansion during lithiation/delithiation.	Maintains electrical contact across expanding silicon particles, suppresses structural pulverization, and dramatically extends cycling capacity retention.
Supercapacitors and Pseudocapacitors	Utilized as the primary or secondary electrode material in electric double-layer capacitors (EDLC) and hybrid energy storage devices.	Maximizes charge accumulation at the electrode-electrolyte interface, delivering elevated power density, rapid charge response, and ultra-long cycle stability.
Solid-State Battery Electrodes	Blended with solid electrolytes and active materials to ensure continuous electronic percolation across rigid solid-solid particulate interfaces.	Overcomes interfacial resistance barriers in all-solid-state cells, enabling efficient charge transfer without liquid electrolyte wetting.
Thermal Interface and Dissipation Materials	Compounded into thermal pads, phase change materials, and dissipation coatings for electronic packaging and battery module heat management.	Provides superior in-plane thermal conductivity pathways, reducing thermal resistance and mitigating hazardous battery pack hotspots.
Conductive Polymer and Elastomer Composites	Compounded into engineering thermoplastics, thermosets, and rubbers to impart antistatic, electromagnetic interference (EMI) shielding, or conductive properties.	Achieves the electrical percolation threshold at minimal additive loading, preserving the host polymer's inherent tensile and mechanical properties.
Electrochemical Sensors and Catalysts	Deployed as a high-surface-area catalytic support substrate in chemical sensing platforms, fuel cell gas diffusion electrodes, and water-splitting devices.	Increases active catalytic surface density and accelerates heterogeneous electron transfer rates across sensitive detection interfaces.

Parameter	Specification (Item: CL29)
Purity	>95 wt%
Layer Count	5 – 10 layers
Thickness	3.4 – 8 nm
Particle Size / Lateral Dimension (D)	10 – 50 µm
Specific Surface Area (BET)	100 – 300 m^2/g
Physical Appearance	Blackish-brown powder
Material Classification	Multilayer Graphene Powder / Advanced Carbon Nanomaterial

Parameter	Specification (Item: CL29)
Primary Compatibility	Lithium battery slurries, conductive masterbatches, polymer matrices

Carboxymethyl Cellulose Cmc Powder Binder For Lithium Battery Anode Material

Item Number: CL34

Introduction

Engineered for high-performance battery research, this ultra-pure carboxymethyl cellulose CMC powder binder delivers superior rheological control, robust anti-settling stability, and exceptional aqueous adhesion for lithium-ion battery anode slurries and advanced electrochemical materials development.

Learn More

Application	Description	Key Benefit
Lithium-Ion Graphite Anodes	Used as an anti-settling agent and aqueous binder in standard artificial and natural graphite negative electrode slurries.	Prevents active mass agglomeration, enhances slurry shelf life, and ensures smooth doctor-blade coating onto copper foil.
Silicon-Graphite Composite Anodes	Incorporated into high-capacity anode systems containing silicon nanoparticles, SiO, or silicon-carbon blends.	Accommodates extreme volume expansion through flexible hydrogen-bonding networks, preventing particle pulverization and electrode peeling.
Lithium-Sulfur (Li–S) Cathodes	Serves as a multifunctional binder and polysulfide immobilizer in sulfur-carbon composite cathode formulations.	Suppresses the polysulfide shuttle effect, stabilizing capacity retention and extending reversible cycle life.
Aqueous Sodium-Ion Anodes	Utilized in hard carbon and non-graphitizable carbon anode fabrication using environmentally friendly water-based processing.	Eliminates reliance on NMP solvents while establishing robust interfacial bonding on aluminum or copper substrates.
Solid-State Composite Interlayers	Applied as a polymeric binder in thin-film ceramic and composite solid electrolyte slurry preparations.	Provides uniform particle dispersion and flexible mechanical integrity prior to high-density sintering or pressing.
High-Speed Roll-to-Roll Slurry Coating	Integrated into pilot and production electrode slurry lines requiring precise shear-thinning and fast leveling.	Yields defect-free, pinhole-free green coatings with uniform areal mass loading across high-throughput coating lines.

Technical Parameter	Specification Standard	Measured Lot Value (CL34)	Status / Test Method
Product Item Code	CL34	CL34	Reference Standard
Physical Appearance	White Powder	White Powder	Visual Inspection
Chemical Purity	> 99.5%	99.7%	Titration Analysis
Viscosity (2% Aqueous Solution)	7,000 ~ 10,000 mPa·s	7,458 mPa·s	Rotational Viscometer (25°C)
Degree of Substitution (D.S.)	0.6 ~ 0.9	0.86	Chemical Analysis
Water Content	< 10.0%	5.35%	Karl Fischer / Loss on Drying
pH Value (1% Solution)	6.0 ~ 8.5	6.77	pH Potentiometry
Lead (Pb) Impurity	< 15 ppm	Compliant (Pass)	Atomic Absorption Spectroscopy
Iron (Fe) Impurity	< 40 ppm	Compliant (Pass)	Colorimetric / ICP Analysis
Arsenic (As) Impurity	< 2 ppm	Compliant (Pass)	ICP-MS Analysis
Solvent Compatibility	Deionized Water	Deionized Water	Complete Aqueous Dissolution
Primary Function	Anode Thickener / Anti-Settling	Anode Thickener / Anti-Settling	Battery Slurry Preparation

Kintek Solution
Head Quarter: No.89 Science Avenue, High-Tech Zone,
Zhengzhou, China

info@kindle-tech.com | https://kinteksolution.com