

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	$5.5 \pm 2.0 \mu\text{m}$	Malvern Instruments MASTERSIZER2000
CL18	Particle Size Distribution (PSD)	D50	$11.5 \pm 2.0 \mu\text{m}$	Malvern Instruments MASTERSIZER2000
CL18	Particle Size Distribution (PSD)	D90	$21.0 \pm 4.0 \mu\text{m}$	Malvern Instruments MASTERSIZER2000
CL18	Particle Size Distribution (PSD)	Dmax	$\leq 50.0 \mu\text{m}$	Malvern Instruments MASTERSIZER2000
CL18	Moisture Content	Water Content	≤ 600 ppm	Metrohm 831-860 Karl Fischer Titration
CL18	Tap Density	Bulk Compaction Density	$\geq 2.4 \text{ g/cm}^3$	BT303 Tap Density Tester
CL18	Specific Surface Area (SSA)	BET Method	$1.8 \pm 0.5 \text{ m}^2/\text{g}$	Micromeritics TriStar 3000
CL18	pH Value	Alkaline Index	≤ 11.7	METTLER TOLEDO FE30 pH Meter
CL18	Residual Alkali Content	Hydroxide (OH ⁻)	$\leq 0.2 \text{ wt}\%$	METTLER TOLEDO G20 Potentiometric Titrator

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CL18	Residual Alkali Content	Carbonate (CO_3^{2-})	$\leq 0.4 \text{ wt\%}$	METTLER TOLEDO G20 Potentiometric Titrator
CL18	Electrochemical Performance	Specific Discharge Capacity	$\geq 200 \text{ mAh/g}$	Half Cell Evaluation (0.1C/0.1C, 3.0–4.3V vs. Li^+/Li)