

Lithium Ion Battery Cathode Material Lithium Manganese Oxide Lmo Limn2O4 Powder

Item Number: CL17



Introduction

High-purity spinel lithium manganese oxide LMO LiMn_2O_4 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 ($\text{Li}_4\text{Ti}_5\text{O}_{12}$) 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)

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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/cm ³	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	m ² /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/cm ²	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 LiPF ₆ 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/cm ³	Optical bend inspection (fold test method)*
Electrode Compacting	Design Mid-Limit Density	2.70	2.70	g/cm ³	Target production calendaring 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