

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 ($\leq 3 \mu\text{m}$) 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	Na ₂ /3(Fe ₁ /2Mn ₁ /2)O ₂
Chemical Properties	Molar Stoichiometry Ratio (Na : Fe : Mn : O)	2/3 : 1/2 : 1/2 : 2 (mol)
Chemical Properties	Chemical Purity (wt%)	$\geq 99.9\%$ (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)	$\leq 3 \mu\text{m}$
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)	$\leq 12 \text{ ppm}$
Trace Impurity Limits	Nickel (Ni)	$\leq 35 \text{ ppm}$

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