

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 Na ₃ V ₂ (PO ₄) 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 : Na ₃ V ₂ (PO ₄) 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