

Tantalum Aluminum Co Doped Lithium Lanthanum Zirconate Powder Solid State Electrolyte 0.2Al Li6.75La3Zr1.75Ta0.25O12 For Advanced Batteries

Item Number: FZ64



Introduction

Engineered for solid-state battery R&D, this 3N grade tantalum aluminum co-doped lithium lanthanum zirconate powder delivers high room-temperature ionic conductivity of 2×10^{-3} S/cm, controlled 325 mesh particle size, ultra-low impurities, and exceptional cubic garnet phase stability for research.

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Application	Description	Key Benefit
All-Solid-State Lithium Metal Batteries	Primary bulk solid electrolyte material used for hot-pressed or cold-pressed electrolyte pellets and membranes in solid-state cell architectures.	Delivers high ionic transport and mechanical strength to effectively block lithium dendrite growth.
Composite Solid Electrolyte (CSE) Membranes	Fillers combined with polymer matrices (e.g., PEO, PVDF) to form flexible hybrid solid electrolyte sheets for pouch cell assembly.	Enhances overall ionic conductivity and mechanical thermal stability of polymer electrolyte matrices.
Interfacial Protective Coatings	Thin film or slurry coating applied at the interface between lithium metal anodes and solid electrolytes or cathode active materials.	Reduces interfacial impedance, stabilizes solid-electrolyte interphase (SEI), and prevents undesirable side reactions.
Ceramic Separator Development	Fabrication of dense, ultra-thin self-supporting ceramic separators for next-generation rigid solid-state battery cells.	Provides superior chemical and thermal safety compared to conventional liquid-soaked polyolefin separators.
Academic & Advanced Materials R&D	Benchmark ceramic oxide material for fundamental electrochemical research, solid-state transport kinetics, and novel sintering technology studies.	Standardized phase purity and reliable stoichiometry ensure reproducible scientific research data.

Specification Parameter	Value / Detail
Product Identifier	FZ64
Chemical Formula	0.2Al-Li6.75La3Zr1.75Ta0.25O12
Material Designation	Tantalum & Aluminum Co-Doped Lithium Lanthanum Zirconate (Ta/Al-LLZO)
Material Purity (wt%)	≥ 99.9% (3N Grade)
Particle Size	325 Mesh
Physical Appearance	Light Yellow Powder
Crystal Structure	Cubic Garnet Phase (ICSD #422259)
Ionic Conductivity (S/cm)	2×10^{-3} S/cm (at room temperature)
Chemical Molar Ratio	Al : Li : La : Zr : Ta : O = 0.2 : 6.75 : 3 : 1.75 : 0.25 : 12

Impurity Element	Maximum Content (ppm)
Iron (Fe)	≤ 15
Copper (Cu)	≤ 10

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Manganese (Mn)	≤ 12
Calcium (Ca)	≤ 10
Sodium (Na)	≤ 6
Potassium (K)	≤ 7
Magnesium (Mg)	≤ 8
Niobium (Nb)	≤ 25
Nickel (Ni)	≤ 10
Silicon (Si)	≤ 15
Yttrium (Y)	≤ 15