

il IONERA

STRATEGIC BATTERY CHEMICALS &
ADVANCED ENERGY FLUIDS

ULTRA-HIGH PURITY MATERIALS
FOR THE FUTURE OF ENERGY



ENGINEERING THE CHEMICAL CORE OF FUTURE ENERGY

IONERA is the advanced battery chemicals and energy fluids company of OSAN Energy, operating at the intersection of electrochemical refining, precision chemical engineering, and strategic materials science.

Built to serve the rapidly evolving global energy economy, Ionera transforms critical raw materials into ultra-high-purity chemical compounds essential for advanced battery systems, large-scale energy storage, defense power architectures, and future energy technologies.

From raw strategic minerals to battery-grade finished products, Ionera delivers a fully integrated industrial ecosystem engineered for uncompromising purity, consistency, traceability, and supply reliability.

IONERA is not a conventional chemical manufacturer. It is a strategic energy materials platform powering the next generation of global energy infrastructure.

KEY INDUSTRIAL STRENGTHS



ULTRA-HIGH PURITY PRODUCTION
Battery-Grade Benchmark:
99.5% – 99.9%



MULTI-STAGE REFINING
Electrochemical + Chemical



PROCESS MONITORING
24/7 Closed-Loop Control



QUALITY STANDARD
PPM-Level
Impurity Control



MANUFACTURING MODEL
Full Vertical
Integration

PROPRIETARY PRODUCTION TECHNOLOGIES

Ionera's manufacturing architecture combines advanced electrochemical refining, precision chemical synthesis, controlled crystallization, and intelligent process automation to achieve battery-grade purity and industrial-scale consistency.

Each production stage is engineered to minimize impurities, maximize chemical stability, and ensure uncompromising performance across mission-critical energy applications.

PRODUCTION FRAMEWORK



PROCESS STABILITY
Ultra-High Consistency



IMPURITY CONTROL
PPM-Level Monitoring



BATCH TRACEABILITY
End-to-End Digital Validation



AUTOMATION
Intelligent Process Control

01

ELECTROCHEMICAL REFINING



Advanced ionic separation and impurity removal for strategic metals, enabling ultra-high-purity precursor production.

02

MULTI-STAGE CHEMICAL SYNTHESIS



Precision-controlled reaction systems engineered for complex inorganic and specialty battery compounds.

03

PRECISION CRYSTALLIZATION



Particle morphology, crystal uniformity, and moisture control optimized for battery-grade performance.

04

SMART MANUFACTURING INTELLIGENCE



Real-time analytics, batch traceability, predictive control, and closed-loop process optimization.



BATTERY CHEMICALS PRODUCT PORTFOLIO

Ionera produces ultra-high-purity battery-grade chemical compounds engineered for advanced cathode systems, energy storage architectures, and mission-critical power applications.

Each product family is developed under strict impurity control, precision synthesis, and battery-grade manufacturing discipline.

PRODUCT BENCHMARK



PURITY RANGE
99.5% – 99.9%



IMPURITY STANDARD
PPM-Level Control



PRODUCTION GRADE
Battery-Grade



QUALITY VALIDATION
Batch-Certified

01

LITHIUM COMPOUNDS

High-purity lithium chemical compounds engineered for advanced battery chemistries and high-energy-density storage systems.

CORE APPLICATIONS



Electric Vehicle
Batteries



Grid-Scale
Energy Storage



High-Density
Battery Packs



02

NICKEL & COBALT CHEMICALS

Battery-grade nickel sulfate and cobalt sulfate compounds optimized for cathode precursor production and advanced lithium-ion systems.

CORE APPLICATIONS



NMC
Batteries



High-Performance
Cathodes



Defense Energy
Systems



03

MANGANESE CHEMICALS

High-purity manganese sulfate compounds supporting high-stability, high-efficiency battery architectures.

CORE APPLICATIONS



NMC



LMO



LMFP



POWERING CRITICAL ENERGY ECOSYSTEMS

Ionera battery-grade chemical materials enable the performance, safety, and reliability of next-generation energy systems across industrial, mobility, defense, and infrastructure applications.

From electric mobility to grid resilience, Ionera supports critical sectors where energy density, thermal stability, and supply reliability are mission-critical.

MARKET RELEVANCE



DEMAND TREND
Structural Growth



STRATEGIC IMPORTANCE
Mission-Critical



SUPPLY REQUIREMENT
High Reliability



INDUSTRY POSITION
Future-Defining

ELECTRIC MOBILITY

High-performance battery materials supporting electric vehicles, heavy-duty mobility platforms, and future transportation systems.

APPLICATIONS

- Passenger EVs
- Commercial Fleets
- Heavy Mobility

DEFENSE ENERGY SYSTEMS

Mission-critical materials for tactical energy storage, autonomous systems, and defense-grade power architectures.

APPLICATIONS

- Tactical Battery Packs
- UAV Power Systems
- Mobile Defense Platforms

GRID ENERGY STORAGE

Battery chemicals engineered for large-scale stationary energy storage and renewable balancing systems.

APPLICATIONS

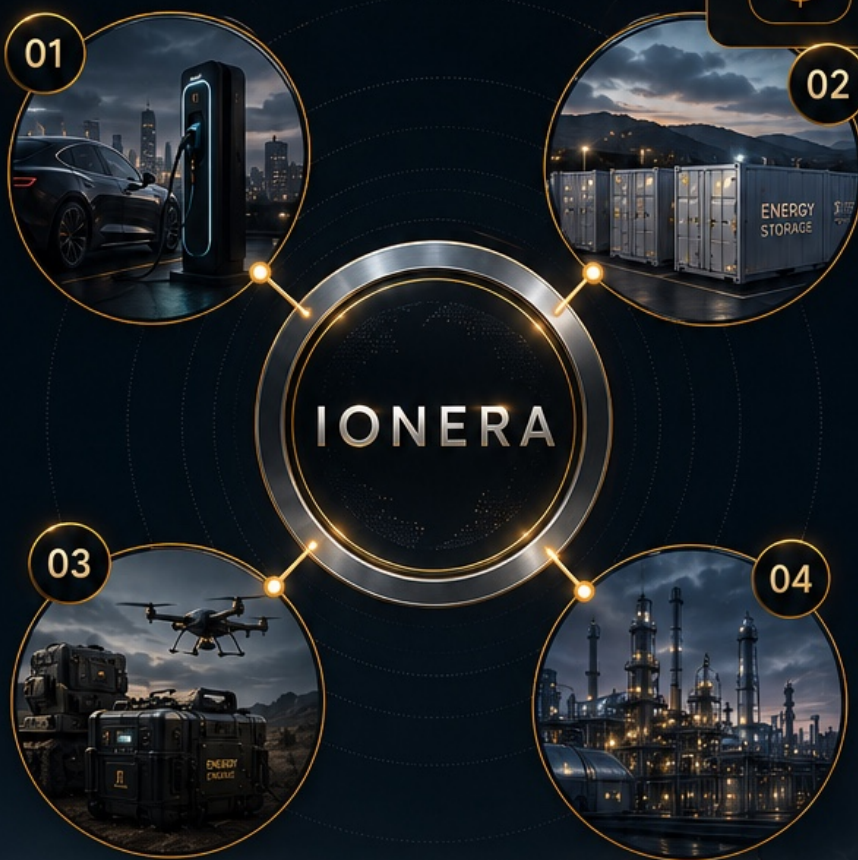
- Utility-scale BESS
- Solar Storage
- Grid Balancing

INDUSTRIAL ENERGY INFRASTRUCTURE

Chemical solutions enabling resilient industrial power systems and high-demand energy operations.

APPLICATIONS

- Critical Manufacturing
- Backup Systems
- Energy-intensive Facilities



STRATEGIC COMPETITIVE ADVANTAGES

Ionera combines industrial-scale production capability, battery-grade purity control, and vertically integrated process intelligence to deliver strategic reliability in critical energy supply chains.

Our competitive advantage is built on precision, consistency, traceability, and long-term industrial resilience.



QUALITY ASSURANCE & SUPPLY INTEGRITY

Ionera applies strict quality validation, impurity control, and full production traceability to ensure every batch meets battery-grade manufacturing requirements.

Our assurance framework is engineered to support procurement confidence, regulatory alignment, and long-term supply reliability across critical energy sectors.

01



RAW MATERIAL QUALIFICATION

Incoming strategic materials undergo strict qualification and analytical validation before production entry.

02



IN-PROCESS MONITORING

Critical process parameters are continuously monitored to maintain purity and consistency.

03



BATCH VALIDATION

Each production batch is validated against internal battery-grade quality thresholds.

04



FINAL RELEASE AUTHORIZATION

Only validated batches meeting release criteria proceed to shipment.

ASSURANCE PILLARS



TRACEABILITY
Full Batch Tracking



VALIDATION
Multi-Stage QC



COMPLIANCE
Audit-Ready



RELEASE
Controlled Authorization



GLOBAL SUPPLY NETWORK & STRATEGIC PARTNERSHIP

Ionera is positioned to support long-term global supply partnerships requiring industrial reliability, quality assurance, and strategic production scalability.

Our supply model is engineered for sustained collaboration across high-demand energy markets and mission-critical industrial sectors.



PARTNERSHIP STRENGTH



SUPPLY MODEL
Long-Term



DELIVERY DISCIPLINE
Batch-Controlled



SCALABILITY
Expansion-Ready



PARTNERSHIP TYPE
Strategic



STRATEGIC APPLICATIONS & END MARKETS

Ionera's battery chemicals and advanced energy materials are engineered for high-performance systems operating across mobility, defense, grid-scale storage, and industrial power infrastructure.

Our materials support energy architectures where reliability, stability, and operational resilience are non-negotiable.

MARKET STRENGTH



APPLICATIONS
Mission-Critical



RELIABILITY
High-Stability



PERFORMANCE
Battery-Grade



MARKETS
Global Strategic

01 |

ELECTRIC MOBILITY

Ionera materials enable high-density battery architectures engineered for advanced electric mobility platforms, delivering superior thermal stability, energy density, and operational performance.



02 |

GRID-SCALE STORAGE

Battery-grade compounds designed for large-scale energy storage systems supporting grid balancing, renewable integration, and power continuity.



03 |

DEFENSE ENERGY SYSTEMS

Strategic battery materials supporting mission-critical defense power architectures requiring reliability under extreme operating conditions.



04 |

INDUSTRIAL ENERGY INFRASTRUCTURE

Advanced energy materials enabling resilient industrial power systems designed for high-load, uninterrupted operational environments.



ENGINEERING STRATEGIC ENERGY MATERIALS FOR TOMORROW

Ionera exists to engineer the materials enabling the next generation of global energy systems.

We believe the future of energy will be defined not only by generation, but by storage, stability, purity, and strategic resilience.



From advanced battery chemicals to mission-critical energy materials, **Ionera** is building industrial capability designed for long-term strategic impact.

As a division of **OSAN Energy** under **OSAN Holding**, we remain committed to engineering materials that strengthen the energy infrastructure of tomorrow.