

Lithium Batteries: Markets and Materials

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Abstracts

SCOPE OF REPORT:

This report begins with a discussion of primary and secondary lithium battery technologies and markets.

Lithium markets and technology are analyzed associated with the following product categories

Portable products

Computing, smartphones, tablets.

Others.

Wearables (Non-Medical Related/Portable) – Consumer segment only.

Medical products

Implantable.

Not implantable.

Wearables (Medical Related) – Consumer segment only.

Stationary applications

Computer memory preservation.

Uninterruptible power supplies.

Load leveling and alternative energy storage.

Residential energy storage.

Military/aerospace

Primary batteries.

Secondary batteries.

Developmental.

Automotive and motive power

Industrial electric vehicles (traction).

Plug-ins and hybrid vehicle motive power (EVs, HEVs and BEVs).

Automotive security.

Fleet operations (primarily electric buses).

The report focuses on these areas associated with battery materials:

Electrode materials and active elements

Aluminum.

Cobalt compounds.

Conductive polymers.

Copper compounds.

Electrolytic manganese dioxide.

Halogens.

Fullerenes.

Inorganic carbon.

Lithium metal and compounds.

Nickel metal and compounds.

Rare earth compounds.

Sulfur compounds.

Vanadium compounds.

Lithium battery electrolytes.

Battery separators.

Market segments are defined, leading global companies are identified, and the markets analyzed (including a five-year market projection). Additional chapters provide projection breakdowns by end-use sector, application and region. Chapter 8 provides a broad overview of patent activity and developments, while Chapter 9 provides an overview of market segmentation, a concise overview of key driving factors influencing markets, and additional forecasts associated with individual products.

Lithium battery companies are identified and profiled. Each profile includes points of contact and a discussion of structure, description and activity. These profiles are found in Chapter 10.

REPORT INCLUDES:

87 data tables and 66 additional tables

A detailed overview and an industry analysis of the lithium batteries in terms of markets and materials

Analyses of global market trends, with data from 2017, 2018, and projections compound annual growth rates (CAGRs) through 2023

Characterization and quantification of market potential for lithium batteries by major types of batteries, technologies, regions, applications and end-users

Details pertaining to continuing evolution of electrification of transportation, the increasing use of energy storage systems both institutionally (electric utilities) and within the household (residential) sector, and the impact of innovations in wearable technologies on this market

Profiles of major market players within the industry, including SAFT, A123 Systems, BASF Battery Materials, Sony Energy Devices Corp., Toshiba and 3M

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DURACELL INTERNATIONAL

EAGLEPICHER CORP. (OM GROUP)
ENERGIZER HOLDINGS INC.
GP BATTERIES (GOLD PEAK INTERNATIONAL)
GREATBATCH INC.
ICCNEXERGY
MEDTRONIC INC.
MINMAX ENERGY TECHNOLOGY
PANASONIC ENERGY CORP. OF AMERICA
SAFT
SONY ENERGY DEVICES CORP.)
ULTRALIFE BATTERIES INC.
VARTA AG MICROBATTERIES
YARDNEY (OM GROUP)
Secondary Lithium Battery Companies
A123 SYSTEMS
ACCUTRONICS LTD.
ADVANCED LITHIUM ELECTROCHEMISTRY CO. LTD. (ALEES)
ADVANCED BATTERY SYSTEMS INC.
AMPRIUS
APPLE INC.
AROTECH CORP.
BASF BATTERY MATERIALS
BATTERY-BIZ
BATTERY CLINIC INC.
BATTERY SYSTEMS INC.
BATTERY TECHNOLOGY INC.
BOLLORE GROUP
BOSTON-POWER
BREN-TRONICS INC.
BRIGHTVOLT
BYD CO. LTD.
C&D TECHNOLOGIES INC.
CELL-CON
CHINA BAK BATTERY INC.
CHINA SUN (DALIAN XINYANG HIGH-TECH DEVELOPMENT CO.)
CONTINENTAL CORP.
DELTRAN BATTERY TENDER
DENCHI POWER LTD.
ELECTROVAYA

ENERDEL
ENERIZE CORP.
ENERSYS INC.
EVEREXCEED CORP.
FARASIS ENERGY
FLUX POWER HOLDINGS INC.
FURUKAWA BATTERY CO.
GENERAL MOTORS
GP BATTERIES (GOLD PEAK INTERNATIONAL)
GS YUASA.
HITACHI MAXELL CORP.
HIGHPOWER INTERNATIONAL
HYB BATTERY CO. LTD.
ILIKA TECHNOLOGIES LTD.
INDUSTRIAL BATTERY ENGINEERING
JOHNSON CONTROLS
JOHNSON MATTHEY BATTERY SYSTEMS (AXEON)
K2 ENERGY
LG CHEMICAL
MICROVAST POWER SYSTEMS LTD.
MILLIBATT INC.
MINING CORP. OF BOLIVIA (COMIBOL)
MINMAX ENERGY TECHNOLOGY CO. LTD.
MITSUBISHI CORP.
NEC ENERGY DEVICES LTD.
NEXCELL BATTERY CO.
NISSAN MOTOR CO.
ODYNE SYSTEMS LLC
OXIS ENERGY LTD. U.K.
PANASONIC
POLYPLUS BATTERY CO.
POWER JAPAN PLUS
PRIMEARTH EV ENERGY
SAFT
SAMSUNG SDI
SEEO
SILATRONIX INC.
SION POWER
SOLIDENERGY

SONY ENERGY DEVICES CORP.
TESLA MOTORS
TIAX LLC
TIANJIN LISHEN BATTERY JOINT-STOCK CO. LTD.
TOSHIBA
VALENCE TECHNOLOGY INC.
WINSTON BATTERY LTD.
XALT ENERGY LLC
YARDNEY (OM)
ZAF ENERGY SYSTEMS
ZINERGY UK
Electrode Material and Active Element Companies
3M
ABERDEEN INTERNATIONAL INC.
ACHESON COLLOIDS INC. (HENKEL)
ACTA S.P.A.
ADMIRALTY RESOURCES
AJAY SQM GROUP
AKZO NOBEL
ALBEMARLE CORP.
ALFA AESAR (JOHNSON MATTHEY)
ALLAN CHEMICAL CORP.
ALLCHEM INDUSTRIES INC.
ALTAIR NANOTECHNOLOGIES INC.
AMETEK
AMSYN (AMBER SYNTHETICS)
APPLIED NANOMATERIALS INC.
ARKEMA
ASBURY CARBONS
ASHLAND CHEMICALS
ASHBURTON VENTURES INC.
AVALON RARE METALS
AVCARB
BARIUM & CHEMICALS INC.
BASF CORP.
CABOT CORP.
CALEDONIA MINING CORP.
CANADA LITHIUM CORP.
CANNON-MUSKEGON CORP. (C-M GROUP)

CELGARD LLC
CHAMBISHI METALS PLC (ZCCM-IH)
CLIMAX MOLYBDENUM
COLUMBUS CHEMICAL INDUSTRIES
CONTEMPORARY AMPEREX TECHNOLOGY LTD. (CATL)
COVALENT ASSOCIATES INC.
COYNE CHEMICAL
CTT
DAIS ANALYTIC CORP.
DARAMIC
DARTON COMMODITIES LTD.
DEXMET CORP.
DYNATEC MADAGASCAR S.A.
ENTEK MEMBRANES LLC
ERAMET/EUROTUNGSTENE POUDRES S.A.
EVONIK INDUSTRIES AG
ENEVATE
EUROPEAN LITHIUM
EVRAZ STRATCOR INC.
FERRO CORP.
FMC CORP.
FORMATION METALS INC.
FRONTIER CARBON CORP.
FUSITE
GALAXY RESOURCES
GFS CHEMICALS INC.
GLENCORE XSTRATA
GRAFTECH INTERNATIONAL LTD.
HENKEL
HERMETIC SEAL TECHNOLOGY INC.
HOLLINGSWORTH AND VOSE CO.
HONJO CHEMICAL CORP.
HUNAN XIANGTAN ELECTROCHEMICAL GROUP
INNOVIA
INTERNATIONAL COBALT CO. INC.
INTERNATIONAL LITHIUM CORP. (GANFENG LITHIUM CO.)
JOHNSON MATTHEY INC.
JUNGFER
LAMART CORP.

LITHIUM CORP.
LITHIUM EXPLORATION GROUP
LITHIUM WERKS
LG CHEMICAL
LYNNTECH INC.
MPHASE TECHNOLOGIES
MATERIALS AND ELECTROCHEMICAL RESEARCH CORP.
MAXPOWER INC.
MAYS CHEMICAL CO.
MCGEAN SPECIALTY CHEMICALS/MCGEAN ROHCO
MITSUI & CO., LTD.
NANO-C INC.
NANOCYL S.A.
NEMASKA LITHIUM
NEPTCO
NIPPON KODOSHI CORP. (NKK)
NORILSK NICKEL
OM GROUP INC.
PHOSTECH LITHIUM
POREX TECHNOLOGIES
PPG SILICA PRODUCTS
PRAYON
PRED MATERIALS INTERNATIONAL INC.
PRINCE MINERALS INC.
QUEENSLAND NICKEL
RAYMOR INDUSTRIES INC.
READE ADVANCED MATERIALS
RETRIEV TECHNOLOGIES INC.
ROCK TECH LITHIUM
SHALINA RESOURCES LTD.
SHELDAHL TECHNICAL MATERIALS
SHEPHERD CHEMICAL CO.
SHOWA DENKO K.K.
SHU POWDERS LTD.
SICHUAN LITHIUM INDUSTRIES
SK ENERGY CORP.
SOLVAY PERFORMANCE CHEMICALS
SPECTRUM CHEMICALS
SQM (SOCIEDAD QUIMICA Y MINERA)

SUMITOMO METAL MINING CO. LTD.
SUPERIOR GRAPHITE CO.
TECHNICAL FIBRE PRODUCTS LTD.
TECK RESOURCES LTD.
TEXMAC INC.
THOMAS SWAN & CO. LTD.
TIAX
TIMCAL GRAPHITE & CARBON
TORAY
TRONOX INC.
UBE INDUSTRIES
UMICORE
UNIDYM
VALE CANADA
WESTERN LITHIUM
W. L. GORE & ASSOCIATES, INC.
WOGEN RESOURCES LTD.
XIAMEN TUNGSTEN CO. LTD.

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A*STAR INSTITUTE OF MATERIALS RESEARCH
AMES NATIONAL LABORATORY
ARGONNE NATIONAL LABORATORY
ARIZONA STATE UNIVERSITY
BATTELLE MEMORIAL INSTITUTE
BROOKHAVEN NATIONAL LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
CALIFORNIA NANOSYSTEMS INSTITUTE (UCLA)
CENTER FOR ADVANCED MATERIALS
CLEAN ENERGY GROUP
ECOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE
FLORIDA STATE UNIVERSITY
FLUID MECHANICS RESEARCH GROUP
GEORGIA INSTITUTE OF TECHNOLOGY
HUNTER COLLEGE
IDAHO NATIONAL LABORATORY
JOHN H. GLENN RESEARCH CENTER
JOHN HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY

KYOTO UNIVERSITY
KYUSHU UNIVERSITY
LABORATOIRE D'ELECTROCHIMIE ORGANIQUE ET DE PHOTOCHEMIE R?DOX
LAWRENCE BERKELEY NATIONAL LABORATORY
LAWRENCE LIVERMORE NATIONAL LABORATORY
LOS ALAMOS NATIONAL LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
MAX PLANCK INSTITUT F?R FESTKORPERFORSCHUNG
MICHIGAN STATE UNIVERSITY
NASA AMES RESEARCH CENTER
NASA JET PROPULSION LAB
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
NATIONAL RENEWABLE ENERGY LABORATORY
NORTH CAROLINA STATE UNIVERSITY
NORTHWESTERN UNIVERSITY
NYU POLYTECHNIC SCHOOL OF ENGINEERING
OAK RIDGE NATIONAL LABORATORY
OHIO STATE UNIVERSITY
OREGON STATE UNIVERSITY
PACIFIC NORTHWEST NATIONAL LABORATORY
PRINCETON UNIVERSITY
PURDUE UNIVERSITY
BIRCK NANOTECHNOLOGY CENTER
RENSSELAER POLYTECHNIC INSTITUTE (RPI)
RICE UNIVERSITY
THE RICHARD E. SMALLEY INSTITUTE FOR NANOSCALE SCIENCE AND
TECHNOLOGY
ROCHESTER INSTITUTE OF TECHNOLOGY
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
SANDIA NATIONAL LABORATORIES
SAVANNAH RIVER NATIONAL LABORATORY
SIMON FRASER UNIVERSITY
SOPHIA UNIVERSITY
STANFORD UNIVERSITY
STATE UNIVERSITY OF NEW YORK (SUNY)
UNIVERSIT? LA SAPIENZA
UNIVERSIT?T T?BINGEN INSTITUT F?R ORGANISCHE CHEMIE
UNIVERSITY OF CALIFORNIA
UNIVERSITY OF CHICAGO

UNIVERSITY OF COLORADO
UNIVERSITY OF DAYTON RESEARCH INSTITUTE
UNIVERSITY OF DURHAM
UNIVERSITY OF ILLINOIS
UNIVERSITY OF KENTUCKY
UNIVERSITY OF MASSACHUSETTS
UNIVERSITY OF MINNESOTA
UNIVERSITY OF MISSOURI
UNIVERSITY OF NEVADA AT LAS VEGAS
UNIVERSITY OF NEW MEXICO
UNIVERSITY OF NEW SOUTH WALES
UNIVERSITY OF NORTH CAROLINA
UNIVERSITY OF OKLAHOMA CARBON NANOTUBES TECHNOLOGY CENTER
(CANTEC)
UNIVERSITY OF PENNSYLVANIA
UNIVERSITY OF RHODE ISLAND
UNIVERSITY OF SOUTHERN CALIFORNIA
UNIVERSITY OF ST. ANDREWS
UNIVERSITY OF TEXAS AT AUSTIN
UNIVERSITY OF TOKYO
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Figure 2: Global Market for Secondary Lithium Batteries, by Type, 2017-2023

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