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World Battery Materials

Industry Study with Forecasts for **2012 & 2017**

Study #2477 | April 2009 | \$5600 | 336 pages

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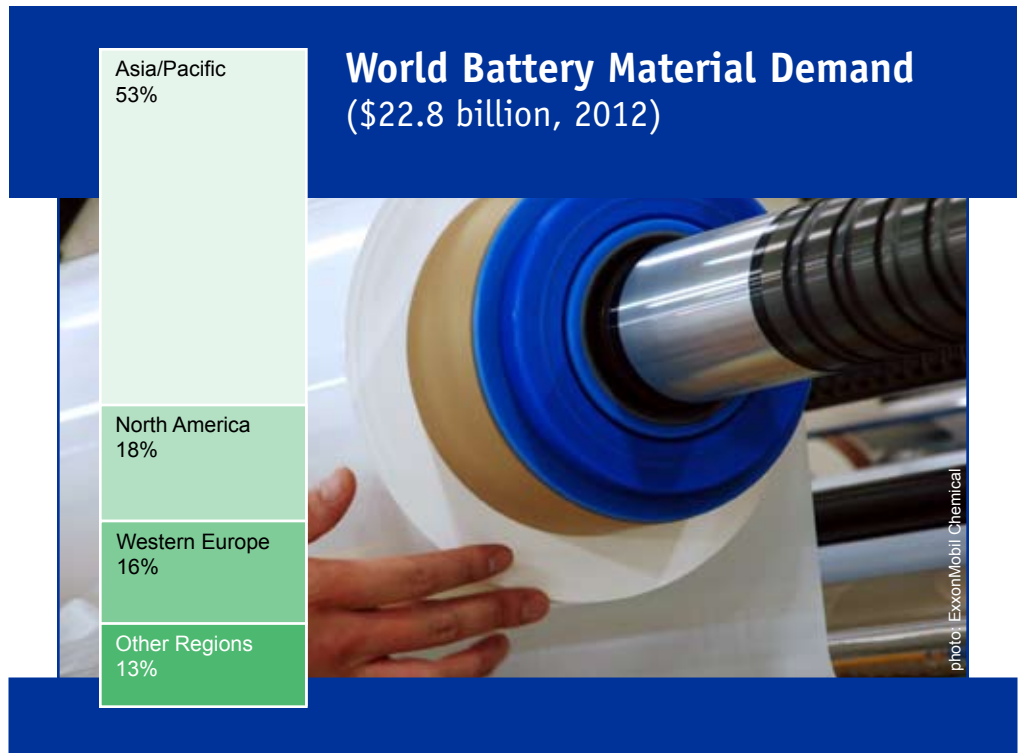
Gains will be driven by strong growth in the production of lithium ion (Li-Ion) and nickel metal hydride (Ni-MH) batteries, which are increasingly being used in electronics and motor vehicles.

Global demand to rise 3.9% yearly through 2012

World demand for materials used in the manufacture of batteries will rise 3.9 percent per year to \$22.8 billion in 2012. Gains will be driven by strong growth in the production of lithium ion (Li-Ion) and nickel metal hydride (Ni-MH) batteries, which are increasingly being used in consumer electronics and motor vehicles. Additionally, rising income levels in the developed world will fuel demand for materials in alkaline and lithium consumer batteries.

Metals to remain dominant battery material, chemicals to see most rapid growth

Metals will continue to be the dominant battery material product type through 2012, with the fastest growth found in smaller-volume products used in advanced batteries, including lithium and rare earth metals. Chemical materials will see the fastest gains of any material type, with robust demand for high-value lithium and nickel chemicals fueled by rising production of Li-Ion and Ni-MH batteries. A major shift is underway in the market for lithium chemicals, as battery-makers seek to reduce the cobalt content of Li-Ion cathode materials, spurring demand for products such as lithium iron phosphate and lithium mixed-metal compounds. Gains for manganese chemicals will also benefit from rising production of alkaline batteries, particularly in the developing world.



Asia/Pacific region to continue as dominant, fastest growing market

Among the major world regions, the most rapid growth in battery materials demand will be seen in Asia. Most of the gains will be centered in China, which has grown to become the largest battery materials market in the world. India, Indonesia and South Korea are also expected to see above-average advances in materials demand. Much of this growth, however, will come at the expense of regional neighbor Japan, as battery production migrates out of the country, following the electronics industry to lower-cost locations elsewhere in Asia.

Demand for battery materials in North America and Western Europe will see much less favorable prospects through 2012, due to maturing local markets for batteries and an expected drop in the price of lead, a key material in the regions' markets. However, there are opportunities for growth in areas such as advanced rechargeable cells, as domestic production of batteries for hybrid/electric vehicles is beginning to be established in these regions. Gains for battery materials in the other regions -- Latin America, Eastern Europe and the Africa/Mideast region -- will outpace the developed world markets, though they will remain largely focused on low-end zinc-carbon and lead-acid battery applications.

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**Sample Text,
 Table & Chart**

ASIA/PACIFIC

South Korea: Battery Materials Demand by Type

Demand for battery materials in South Korea is forecast to reach \$5 billion in 2012, below the average of \$6 billion in 2007. Demand is forecast to be in line with the world market. Demand for chemicals and other battery materials will grow at a markedly slower rate than metals. In these markets, value demand for lead and zinc will drop from elevated 2007 levels to 2002 levels by 2012 as a result of sluggish growth through 2012 as well as declining zinc-carbon battery production in South Korea. Robust gains in demand will be seen for smaller-volume batteries including aluminum, copper, nickel, lithium and rare earth metals by increasing production of nickel- and lithium-based batteries.

Lithium chemicals account for the largest portion of battery chemicals demand in South Korea (more than 60 percent of the total in 2007), a reflection of the country's status as a world leader in Li-Ion battery production. Lithium-based products will also be the fastest-growing chemical materials through 2012, with demand advancing over nine percent per year. Less favorable prospects are expected for lead and manganese chemicals, although the latter will benefit somewhat from rising alkaline battery shipments in South Korea. Among other battery materials, strongest growth is expected for graphite materials and fluoropolymers, both of which will be fueled by increasing output in South Korea's buoyant Li-Ion industry.

Among the suppliers of battery materials serving the market in South Korea are A123 Systems (lithium chemicals), China Sun Group High-Tech, Eramet, Umicore and Xiangtan Electrochemical Scientific. In June 2008, Umicore announced plans to expand its Cheonan plant by adding new manufacturing lines for lithium cobalt oxide and mixed-metal lithium compounds. The expansion, which will increase the

TABLE VI-10

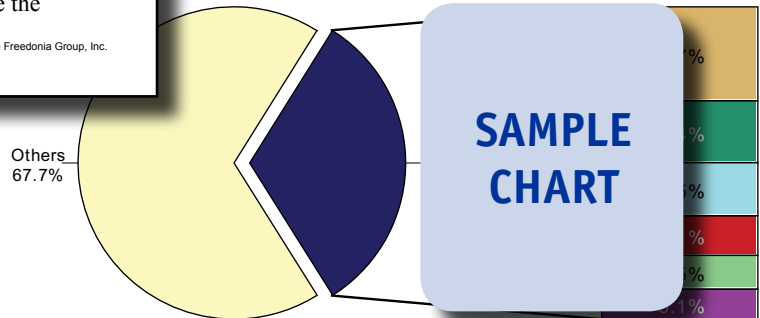
**SOUTH KOREA -- BATTERY MATERIALS DEMAND BY TYPE
 (million dollars)**

Item	1997	2002	2007	2012	2017
Battery Materials Demand					50
Metals:					0
Lead					5
Zinc					9
Steel					5
Other Metals					1
Chemicals:					2
Lithium					0
Manganese					0
Lead					0
Other Chemicals					2
Other Materials:					8
Carbon/Graphite					2
Polymers					7
All Other					29

**SAMPLE
 TABLE**

CHART VIII-1

**WORLD BATTERY LEAD MARKET SHARE, 2007
 (\$8.5 billion)**



**SAMPLE
 CHART**

**Sample Profile,
 Table & Forecast**

TABLE VI-11
**SOUTH KOREA -- BATTERY MATERIALS DEMAND
 BY APPLICATION**
 (million dollars)

Item	1997	2002	2007	2012	2017
Battery Materials Demand					50
Primary Batteries:					45
Alkaline					72
Zinc-Carbon					21
Other Primary					52
Secondary Batteries:					15
Lead-Acid					95
Lithium-Based					10
Other Secondary	30	47	66	75	110

**SAMPLE
 PROFILE**

“Primary battery materials demand in South Korea will advance 2.8 percent per year to \$115 million in 2012. Primary materials only accounted for 15 percent of total battery material sales in South Korea in 2007, the lowest primary share of any major Asia/Pacific nation, as battery manufacturing in the country is heavily weighted toward advanced secondary cells. The market in South Korea is led by alkaline and zinc-carbon materials, although these two applications are trending in much different directions.”
 --Section VI, pg. 186

COMPANY PROFILES

A123 Systems Incorporated
 Arsenal on the Charles
 321 Arsenal Street
 Watertown, MA 02472
 617-778-5700
 http://www.a123systems.com

Revenues: \$115 million in 2007
 Geograph: North America 45%, Europe 16%, Asia/Pacific 39%
 Employm: 1,000

Key Products: Lithium ion battery materials

A123 Systems is engaged in the design, production and sale of advanced, rechargeable lithium ion (Li-Ion) batteries and battery systems, and the development of related materials and technologies. The Company primarily serves the portable power, transportation and electric grid services markets. A123 Systems filed an initial public offering in August 2008.

The Company is involved in the world battery materials industry through the manufacture of nanoscale lithium iron phosphate cathode materials for Li-Ion batteries. These materials are based on A123 Systems’ proprietary NANOPHOSPHATE electrode technology. The Company’s battery materials are used in the internal production of Li-Ion cells with high power capabilities, abuse tolerance, stability, and extended calendar and cycle life that are suitable for use in power tools, hybrid-electric vehicles, electric vehicles and other applications. In addition, A123 Systems is engaged in the development of new battery materials and related technologies to improve the performance of and expand applications for the Company’s cells and battery systems.

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OTHER STUDIES

Batteries in China

This study analyzes the Chinese battery industry. It presents historical demand data (1997, 2002, 2007) and forecasts for 2012 and 2017 by type (e.g., zinc-carbon/zinc-chloride, alkaline, primary lithium, lead-acid, rechargeable lithium, nickel-cadmium, nickel-metal hydride) and market (e.g., consumer, industrial, government, electric bicycles and motor vehicles, portable devices, motive power, backup power). The study also considers market environment factors, evaluates company market share and profiles industry participants.

#2466 05/2009..... \$5200

Batteries

US demand for primary and secondary batteries will reach \$16.8 billion in 2012. Growth will be supported by healthy demand for battery-driven electronics and a shift toward higher-priced, better-performing batteries. In the secondary battery segment, the rapidly growing market for hybrid vehicles will boost demand for Ni-MH and Lilon batteries. This study analyzes the \$14.9 billion US battery industry, with forecasts for 2012 and 2017 by product and market. It also evaluates market share and profiles industry players.

#2449 01/2009..... \$4800

Advanced Ceramics

US demand for advanced ceramics will grow 3.8% yearly through 2012. Growth in the key electronic component market will be based on materials substitution, as ceramics gain use over alternatives. The medical product market will grow the fastest, benefiting from the increasing use of ceramics in joint implants and dental procedures. This study analyzes the \$10.5 billion US advanced ceramics industry, with forecasts for 2012 and 2017 by type, product and market. It also evaluates market share and profiles industry players.

#2433 12/2008..... \$4600

Metal Powders

US metal powder demand through 2012 will improve from a flat 2002 to 2007 performance. Gains will be supported by new uses for many types of metal powders (e.g., iron and steel, stainless steel, aluminum, tungsten). An improved outlook for electronics -- which use the most expensive metal powders -- will boost total value demand. This study analyzes the \$3.5 billion US metal powders industry, with forecasts for 2012 and 2017 by product, application and market. It also evaluates market share and profiles industry players.

#2397 11/2008..... \$4600

World Batteries

Global battery demand will increase 4.8% annually through 2012. China will record the largest gains and surpass the US as the largest market. Consumer battery demand will outperform the market as a whole. Non-lead-acid secondary battery market gains will outpace demand for primary and lead-acid secondary batteries. This study analyzes the \$71 billion world battery industry, with forecasts for 2012 and 2017 by product, market, world region and for 32 countries. It also evaluates market share and profiles industry players.

#2375 10/2008..... \$6100

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