

BASF further broadens its technology base and global market access for battery materials

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- **BASF wants to become the world's leading system supplier of functional materials for high-performance batteries**
- **Research and development activities combined with acquisitions improve technology portfolio and global market access**
- **Production plant for innovative cathode materials to come on stream in Ellyria, USA in Q4 2012**
- **BASF and Volkswagen are jointly sponsoring an international "Science Award Electrochemistry"**

Ludwigshafen, Germany – July 17, 2012 – Over the last few months, BASF has taken several strategic decisions to further strengthen its position in materials for high-performance batteries. Through acquisition of the US companies Ovonic Battery Company and Novolyte Technologies, purchase of Merck's electrolyte activities, conclusion of a license agreement to acquire the lithium iron phosphate technology (LFP) with the LiFePO₄+C Licensing AG and participation in Sion Power, BASF has further improved its technology base and global market access for battery materials. Research and development activities have also been stepped up.

Batteries are chemical power plants

"Most materials in lithium-ion batteries of the kind currently used in electric or hybrid cars are based on innovations from chemistry," said Dr. Andreas Fischer, Vice President Battery Research and Electrochemistry at BASF, in Ludwigshafen/Germany. Especially cathodes, anodes and electrolytes are important for battery performance. "A battery is a chemical power plant in which all the materials have to be optimally matched to each other," added Fischer. "We have therefore initiated numerous research and development projects for these key components in recent years, with the aim of developing innovative materials for high-performance batteries that will significantly increase the range of electric cars while reducing the cost of the battery."

In these activities, BASF researchers are also cooperating with numerous national and international universities and research institutes as well as industry partners. One example is the Innovation Alliance HE-Lion (High Energy Lithium-ion Battery) sponsored by the German Federal Ministry for Education and Research and headed by BASF. "In HE-Lion we are collaborating with other companies such as Bosch and VW and numerous universities and research institutes in developing the next generation of lithium-ion batteries," explained Fischer.

BASF researchers also operate a joint laboratory for the development of new battery materials with the Karlsruhe Institute of Technology (KIT). The two partners are looking to invest about €12 million over the next five years.

BASF is also a founding member and member of the Board of the "Lithium-ion Battery Competence Network" (KLiB) in Ulm, Germany. KLiB is an association of German companies and application oriented research institutes along the lithium-ion battery value chain. The goal is to bundle the competences from industry, science and craft trades in order to strengthen the high-tech and production center Germany.

Lithium-sulfur and lithium-air batteries as technologies of the future

Besides materials for lithium-ion batteries, BASF is also researching future battery concepts such as lithium sulfur and lithium air. "These new technologies promise much higher energy densities and have the potential to further reduce the weight and cost of the batteries," said Fischer. Here too, BASF is cooperating with external partners from science and industry. "We are working on basic questions relating to new materials and functional components, for example in the research network Electrochemistry and Batteries, with scientific partners from Germany, Switzerland, Israel, the USA and Canada. To increase the service life and energy density of lithium-sulfur batteries, BASF is also cooperating with the US company Sion Power," added Fischer.

Acquisitions strengthen technology base and global market access

"Over the last few months, we have taken a major stride closer to achieving our goal of becoming the leading supplier of functional materials and components for existing and future lithium-ion batteries," emphasized Ralf Meixner, Senior Vice President Battery Materials at BASF. "With the latest expansions and additions to our portfolio we have broadened our technology base and our global market access and have further improved our competitive position."

In February this year BASF acquired the US company Ovonic Battery Company, the world leader in nickel-metal hydride batteries (NiMH batteries). "Besides assuming a leading position in nickel-metal hydride battery technology, we have also acquired the long-standing business relationships with the world's largest battery manufacturers," explained Meixner. Ovonic, with its high research competence, is also an ideal fit with BASF development projects

in the battery materials field.

"The acquisition of the electrolyte business for high performance batteries from Merck announced in February and of Novolyte Technologies in April have also significantly strengthened our position as a global supplier of electrolytes for lithium-ion batteries with production centers in Europe, USA and Asia Pacific," said Meixner. BASF acquired the already marketed electrolyte products and the research portfolio from Merck. The acquisition of the Novolyte business included the development, manufacture and marketing of high-performance electrolyte formulations with production centers in the USA and China.

Another milestone is BASF's first production plant for cathode materials in Elyria, USA. "Beginning later this year, we will be producing innovative cathode materials at this site," added Meixner. The facility, with an investment volume of than \$50 million, will be one of the world's most cutting-edge production plants for cathode materials.

In March, BASF also signed a long-term license agreement with LiFePO₄+C Licensing AG in Muttenz, Switzerland, to acquire global rights for the production and marketing of the innovative cathode material lithium-iron phosphate (LFP). LFP cathode materials can be used in all types of lithium-ion batteries and are most suitable for high-performance applications such as hybrid vehicles and grid storage batteries.

"Our agreement with LiFePO₄+C makes BASF the world's only company that can offer its customers the highest-demand cathode materials nickel cobalt manganese and lithium iron phosphate together with a license for their use," explained Meixner.

The global battery market offers BASF major growth prospects. "We assume that in 2020 the global market potential for batteries for electromobility alone could reach €20 billion," added Meixner. He estimates the sales potential for BASF at around €500 million. "In a dynamic market, we want to support our customers' global competitiveness as a solution-oriented system supplier of materials for batteries," said Meixner. "The products are addressed to cell and battery manufacturers. BASF will continue to invest in its own research and development activities, production plants, cooperations and participations." A total investment in the three-digit million euro range is planned for 2011 to 2016.

BASF and Volkswagen are jointly sponsoring an international "Science Award Electrochemistry"

To motivate top-flight researchers and establish itself even more strongly in the field of electrochemistry and its applications, BASF and Volkswagen are sponsoring the international "Science Award Electrochemistry," which was announced in May. The science award is designed to promote outstanding scientific and engineering achievements and deliver impetus for the development of high-performance energy storage systems. The award will be offered annually from now on, and is addressed to scientists working in academic research worldwide. The prize is worth €50,000. Candidates for the science award can apply at the internet platform www.science-award.com by August 3, 2012. The award ceremony will be held on October 22, 2012 in Wolfsburg, Germany.

About BASF

BASF is the world's leading chemical company: The Chemical Company. Its portfolio ranges from chemicals, plastics, performance products and crop protection products to oil and gas. We combine economic success, social responsibility and environmental protection. Through science and innovation we enable our customers in almost all industries to meet the current and future needs of society. Our products and system solutions contribute to conserving resources, ensuring healthy food and nutrition and helping to improve the quality of life. We have summed up this contribution in our corporate purpose: We create chemistry for a sustainable future. BASF posted sales of about €73.5 billion in 2011 and had more than 111,000 employees as of the end of the year. BASF shares are traded on the stock exchanges in Frankfurt (BAS), London (BFA) and Zurich (AN). Further information on BASF is available on the Internet at www.basf.com.

About BASF's Catalysts Division

BASF's Catalysts division is the world's leading supplier of environmental and process catalysts. The group offers exceptional expertise in the development of technologies that protect the air we breathe, produce the fuels that power our world and ensure efficient production of a wide variety of chemicals, plastics and other products, including advanced battery materials. By leveraging our industry-leading R&D platforms, passion for innovation and deep knowledge of precious and base metals, BASF's Catalysts division develops unique, proprietary solutions that drive customer success. Further information on BASF's Catalysts division is available on the Internet at <http://www.catalysts.basf.com/> www.catalysts.basf.com

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