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Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW)

Standort Ulm:
Helmholtzstr. 8, 89081 Ulm

Ulm Battery Research Center, Unique Worldwide, Now Complete

ZSW Paves the Way to Electric Mobility Made in Germany

A new research platform was inaugurated on September 26 in Ulm at a ceremony attended by Federal Minister of Education and Research Johanna Wanka. Leading German industrial companies will be able to develop methods of manufacturing large, vehicle-grade lithium-ion batteries at this facility. A fourth building with 3,600 m² of floor space was added to the ZSW Laboratory for Battery Technology (eLaB) to accommodate a high-tech, industrial-scale manufacturing line. With this new platform and its legacy lab and testing equipment, the ZSW now runs a battery research center that is unique the world over. Scientist and engineers make the most of these assets to demonstrate new active materials, assess components and now also to develop large lithium batteries under much the same conditions as in factories.

The best batteries for electric cars are to come from Germany. This is the goal of the research underway at ZSW. BASF, BMW, Daimler, Elring Klinger, Manz, Robert Bosch, Rockwood Lithium, SGL Carbon and Siemens will start using the Ulm research platform for the first projects as early as January 2015. Initial tests are already underway in the newly erected three-story building. The entire production process from slurry preparation to cell formation is slated to be up and running by the end of the year.

Driving the development of large lithium battery manufacturing in Germany

"The number of electric and hybrid vehicles worldwide is rising fast, so demand for production capacity is growing and competition for the best batteries is in full swing," said Prof. Werner Tillmetz, a member of ZSW's board of directors and head of the Electrochemical Energy Technologies division in Ulm. "With the eLaB and its extension, we have created world-class conditions for research in Ulm that will enable the industry to develop tomorrow's products."

Several hundred high-quality cells can be manufactured per day in a reproducible way with these new systems. The plant's modular layout enables companies and research organizations to assess new processes and system components all along the value chain in a reliable production environment. Manufacturers of battery materials can demonstrate new cell chemistries in standard cells while engineering

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companies are able to optimize their manufacturing technologies in a linked manufacturing process. As Prof. Tillmetz pointed out, "This precompetitive research platform is where the blueprints for commercial manufacturing are drawn up."

The research platform provides everything needed to manufacture automotive-grade cells under close to real-world industrial conditions, including a thermal controlled mixing station for preparing electrode slurries in 60 liter batches, a two-storey machine that applies 500 mm wide electrode coatings to both sides of thin copper or aluminum foils, and a high precision calendering machine for electrode compaction. The fully automated cell assembly line in a 200 m² drying room and the downstream filling and activation system are designed for a one-cell-per-minute cycle time. The cell formation system, also fully automatic, is housed in a 70 m² low-oxygen room with 240 tempered cycle stations and 1,920 storage stations.

The Federal Ministry for Education and Research provided €25.7 million in funding for equipment. The state of Baden-Württemberg's Ministry of Finance and Economy contributed €6 million to build the extension.

Wanka: "We have moved into the fast lane."

Our aim is to become the world's leader of innovation, in particular in respect of modern battery production, which is the precondition for e-mobility 'Made in Germany'," said Federal Research Minister Johanna Wanka. The know-how emerging here in Ulm will become the basis for the sustainable industrial production of the key component in electric vehicles, the battery. Today also marks an important milestone reached in the BMBF's battery research strategy. Says Dr. Wanka, "We have moved into the fast lane."

"Electric mobility solutions are important drivers of innovation in the state of Baden-Württemberg, an automotive stronghold. The key component is the battery – and we have created a global lighthouse for it with the eLaB and the research platform that is now going into operation. The fact that Baden-Württemberg was also able to obtain federal funding for electric mobility, a leading-edge cluster, and the „LivingLab BWe mobil“ showcase yet again attest to the state's status as one of Europe's leading innovation and business regions," said Ingo Rust, Deputy Minister of the Ministry of Finance and Economics of the State of Baden-Württemberg.

The Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW) is one of the leading institutes for applied research in the fields of photovoltaic energy, renewable fuels, battery technology, fuel cells and energy systems analysis. The three ZSW sites at Stuttgart, Ulm and Widderstall are currently staffed with around 230 scientists, engineers and technicians supported by 120 research and student assistants.

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For copies of the images shown here, more topic-related pictures, and a factsheet on ZSW, contact Solar Consulting GmbH.

Pictured on the left: Precision calendering machine for electrode compaction

Right: Mixer for 60-l batches in the eLaB

Bottom: The research platform for industrial lithium-ion cell production is housed in the eLaB's new building on the left.

Photos: ZSW/M.Duckek