

Increasing the Range of Batteries

NorcSi, a tech start-up from Saxony-Anhalt, is developing solutions for electric vehicles

Electric mobility is undoubtedly one of the most important aspects of the energy and mobility transition. However, electric cars have not yet become widely accepted, despite the fact that their price is now more competitive. One reason that is often mentioned is their short battery range and this is where NorcSi GmbH comes in. The start-up from Halle (Saale) in Saxony-Anhalt is opening up new opportunities in battery technology which will allow more powerful batteries to be manufactured more cheaply.

The concepts developed by the young company based at the Weinberg Campus Innovation Hub are likely to arouse a great deal of interest among electric car manufacturers. The team from NorcSi has come up with a method of producing cost-effective silicon electrodes for a future generation of batteries. This will bring about changes in a number of areas, including laptops, smartphones, drones, electric cars and any other applications where lithium-ion batteries are normally used. "Our silicon anodes can significantly increase the storage capacity of the batteries," says CEO Udo Reichmann. "The capacity of our anodes is ten times greater than conventional ones, which gives the battery at least double the range of an existing product."

The innovation lies in the detail

The innovations in the battery technology developed by the company are based primarily on silicon, a raw material that is not harmful to the environment and is also readily available. But using silicon is not a new idea. The innovation lies in the detail. To discover more about this, we need to take a closer look inside the battery. During the process of charging and discharging, the volume of the silicon changes, which makes its structures brittle. The battery begins to lose power and then finally fails completely. "Our technology involves producing silicon nanostructures which give the silicon enough space for its volume to change," explains co-founder Dr. Marcel Neubert. "This means that the anodes and therefore also the batteries remain intact." The innovative technology from Saxony-Anhalt offers another advantage. It could help to reduce weight, which is important in industries such as aviation where every gram counts. Udo Reichmann mentions other areas where the technology could be used: "Drones, tablets and laptops could all be made both lighter and more powerful."

More than ten years of pure research

The idea behind the patented technology goes back to a research project involving the machinery manufacturer Rovak, the Helmholtz-Zentrum Dresden-Rossendorf (HZDR) and the Freiberg University of Mining and Technology. The researchers spent over a decade developing a usable technology. "Without the years of pure research, we would not have this forward-looking technology," confirms Udo Reichmann. "The partners not only repeatedly called the theory into question, but also evaluated the ideas from the user's perspective. It was only these different approaches that revealed the true potential of the project and ultimately allowed us to turn the technology into reality."

Excellent network in Halle (Saale)

The idea of "NorcSi GmbH" originated in years of collaborative research. With the support of the company bmp Ventures, which invests in innovative technology companies together with the IBG Funds, the startup finally took off. First, a business model was jointly developed and finance was structured. Thanks to excellent networks and the investment commitment, bmp Ventures succeeded in locating the promising company in Saxony-Anhalt. Last year the company headquarters and the production facility of NorcSi GmbH were finally established at the Weinberg Campus in Halle (Saale). "Developing new materials is highly complex and identifying their characteristics is correspondingly time-consuming. In Halle we have access to a high-quality network of partners from research and industry, which has helped to accelerate our growth," says Udo Reichmann. Other projects being run by the company have also been given a boost by cooperation with the Interdisciplinary Center of Materials Science (CMAT) at Martin Luther University (MLU) Halle-Wittenberg. "MLU offers excellent opportunities," says the CEO and mentions the first joint research project, which aims to push ahead with the development of silicon anodes 2.0. The technology company is taking a long-term approach. "We are already thinking three to five years ahead," says Dr. Marcel Neubert. The team is receiving support for the project from the start-up accelerator program of the Weinberg Campus in Halle (Saale) and from another accelerator scheme. "All of the company founders already have two decades of experience in industry, but our company is nevertheless a classic high-tech start-up," explains Neubert. "We are happy to receive the support which will give us access to venture capital so that we can develop further."

Delivering a reliable product soon

NorcSi GmbH is currently manufacturing batteries for power and durability testing. At the same time, the results are being transferred to a pre-industrial production process, which means that the first silicon anodes will soon be delivered for industrial trials. The next objective is to build a pilot system with an initial reference customer in order to test the silicon anodes in small-scale production. As Udo Reichmann explains: "We want to deliver a reliable product soon and take our technology up to an industrial scale over the next one to two years." In the future, the company will not only further improve its own silicon anodes for high-performance batteries but will also develop other components specifically for use with silicon anodes. "We currently see ourselves as a technology developer," says Reichmann. "In the future anything is possible. We could become a machinery manufacturer or an anode supplier."

Ideal starting point for positioning in the value chain

NorcSi has plans for growth in Halle (Saale). "Our location in Saxony-Anhalt will allow us to supply the east-west axis of future electric car production," explains Udo Reichmann. "Almost two thirds of the battery plants that are currently planned are within a two-hour drive of our headquarters." That is "an ideal starting point for positioning ourselves in the value chain." The company has also benefited from the fact that the region has decades of experience of silicon photovoltaics, which is obvious from the number of experts in the area, the availability of the latest analytics systems and the accumulated knowledge. And, as Reichmann explains, there is one other thing that is important to everyone in the start-up: "In Saxony-Anhalt, renewable energy makes up 61.5 percent of the total mix, which means that we could manufacture here with a low environmental impact."

Author: Manuela Bock/IMG Saxony-Anhalt

In electromobility, the battery is of central importance as an energy storage device.

Saxony-Anhalt is ideally positioned as a location for battery cell production in Germany - from battery chemicals and material production to battery development and testing.

>> Find out more about battery cell manufacturing in Saxony-Anhalt

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25/09/20

The eDLP, the world’s largest development and test center for high-voltage batteries for passenger cars and commercial vehicles, is due to enter operation at the end of September 2020. This is yet another milestone reached by FEV, the world’s leading independent service provider in vehicle and drive development. The center also represents another chapter in the success story of FEV’s presence in the business location of Saxony-Anhalt – a story that began in 2007 with a groundbreaking ceremony for a continuous testing center for conventional, electric and hybrid drives.

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