

Quantum leap in battery technology / German start-up develops the world's first solid-state battery ready for series production – Outstanding properties: no cobalt, 10 times longer service life and non-flammable electrolyte

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Bonn (Germany)

The Bonn-based company High Performance Battery (HPB) has achieved a decisive breakthrough in battery and storage technology: a team led by Prof. Dr. Günther Hambitzer has developed the world's first solid-state battery with outstanding properties to production readiness. The applications range from stationary storage for home and industrial use to charging infrastructures and the mobility segment – such as the automotive industry. “We are not only opening a new chapter in battery technology,” explains Sebastian Heinz, CEO of HPB, “but are also making a decisive contribution to the energy transition and climate protection worldwide”.

The data and properties measured so far show significantly better values and characteristics compared to the currently dominant lithium-ion batteries.

Longevity: While conventional lithium-ion batteries have to be replaced after about 1,250 charging cycles – with hourly charging and discharging – the HPB solid-state battery currently has at least 12,500 charging cycles, with a comparable load. Since these cells have not yet reached the end of their life, this number will continue to increase steadily.

Safety: The new HPB solid-state electrolyte is non-flammable and thus considerably safer than the flammable liquid electrolytes of conventional lithium-ion batteries.

Sustainability: The HPB solid-state battery shows a 50 percent better environmental balance compared to current lithium-ion technology. This makes it the “green key to the energy and mobility revolution”.

For the automotive industry, which develops its own high-performance rechargeable batteries, HPB provides its safe, robust and outstandingly conductive HPB solid-state electrolyte.

Conductivity: Compared to the liquid electrolytes commonly used today, the HPB solid-state electrolyte has an enormously improved conductivity. This is decisive for the available power from the battery cell. The HPB solid-state electrolyte shows an absolutely higher conductivity at minus 40 °C than conventional liquid electrolytes at their optimum at plus 60 °C. These properties have been confirmed by independent partners and research institutes in the temperature range from minus 40 °C to plus 60 °C.

In this way, the HPB solid-state electrolyte ensures that sufficient power is available even at extreme temperatures. This eliminates the need to preheat the batteries in winter.

Overall, HPB solid-state batteries and HPB solid-state electrolyte make an important contribution to the energy and mobility transition and to reducing dependence on raw materials. While the annual demand for storage was still 180 gigawatt-hours in 2018, it is expected to exceed 2,000 gigawatt-hours by 2030.

The longevity of the HPB solid-state battery improves the economic efficiency of battery storage – across the board in all areas of application. Above all, the combination of individual applications on the same storage unit requires a long service life. This is a financially attractive approach that is often blocked to conventional lithium-ion technology. The energy transition is becoming affordable in the storage segment.

The longevity of the HPB solid-state battery means less raw material use, as the replacement cycles can be significantly extended. The primary materials used can be procured worldwide without any problems. This means that current geopolitical dependencies can also be overcome in the future.

HPB's licensing model is intended to allow a rapid market introduction of the new technology in many fields of application and regions of the world. HPB is in contact with a number of potential licensees. The interest is great: “We are already holding intensive talks – not only in Germany and Europe. In India, too, people are very open to implementing our technology,” Heinz concludes: “In Switzerland, a gigafactory is already being planned that will cover the Swiss market and produce for further licensees.”

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