

PCC SE and Fraunhofer ISE to develop high-tech material for more efficient lithium-ion batteries

PCC manufactures the key starting material for nano-silicon particles with 100% green electricity sourced within Europe.

Duisburg (Germany), December 22, 2021. Duisburg-based investment holding company PCC SE and the Fraunhofer Institute for Solar Energy Systems ISE have joined forces to develop a silicon-carbon composite material designed to increase the performance of lithium-ion batteries. Silicon offers ten times the energy density of the graphite conventionally used as the anode active material in the associated cells. It therefore substantially increases the capacity of lithium-ion batteries, facilitating significantly longer travel ranges and shorter charging times in electric cars, for example. The two cooperation partners plan to bring the novel high-tech material to market as a drop-in solution for use in the production of battery cells.

Yesterday, Tuesday, PCC SE and Fraunhofer ISE signed agreements covering a long-term joint research and development program for a silicon-carbon composite material to be used as an anode active material in lithium-ion batteries. The two partners are to use silicon as the starting material in their cooperation project, a material produced with high sustainability and climate compatibility by PCC's Icelandic subsidiary PCC BakkiSilicon hf. using 100 percent green electricity from geothermal energy. The silicon metal is to be further processed by PCC into powder down to nanometer fineness and then integrated within a silicon-carbon composite using technology developed by Fraunhofer ISE.

"Our silicon metal manufacturing operation in Iceland was designed from the outset to be climate-friendly through the exclusive use of green electricity," explains Dr Peter Wenzel, CEO of PCC SE. "This new field of application for our silicon metal, aligned to enhancing the performance of lithium-ion batteries – particularly in electric cars – therefore provides a perfect fit. By working together with Fraunhofer ISE with all its strengths, we can thus further extend our contribution to climate protection. This takes us another step forward in our strategy to further develop our portfolio of key solutions with

sustainable products that help address the challenges facing our society in the coming decades."

The innovative high-tech material has already been under development in line with requirements emanating from the automotive industry. The active material is designed in such a way that it can be used successively in existing cell production lines as a drop-in replacement for the graphite used as the standard anode material. The higher energy density of the silicon-carbon material also ensures lower specific production costs. The two partners in this cooperation project, PCC SE and Fraunhofer ISE, have expressed their intent to take the solution to full market maturity within a short timeframe.

Aside from the exceptionally favorable carbon footprint of the production process, the nano-silicon particles produced by PCC also offer the advantage of being exclusively European in origin. The silicon metal plant of PCC BakkiSilicon hf. is located in Iceland, whereas China has around 71 percent of the world's graphite reserves. A closed-loop supply chain within Europe is also planned for the further processing stages from nano-particle production to final silicon-carbon material, thus offering future customers a secure and sustainable source of supply close to the rapidly developing European battery industry.

About PCC SE

Headquartered in Duisburg, Germany, PCC SE is the parent and investment holding company of the globally active PCC Group with its more than 3,200 employees. The Group companies of PCC SE have core competencies in the production of chemical feedstocks and specialties, with container logistics forming a further strong pillar in the investment portfolio. An investor committed to the longer term, PCC SE concentrates on continuously increasing the enterprise value of its portfolio companies through sustainable investments and the ongoing creation of new value. The largest chemical producers of the PCC Group are PCC Rokita SA, a major chlorine manufacturer and Eastern Europe's leading producer of polyols, and PCC Exol SA, one of Europe's most advanced surfactant manufacturers. PCC was founded in 1993 by Waldemar Preussner, sole shareholder of PCC SE, who today holds the position of Chairman of the Supervisory Board. The PCC Group generated consolidated sales of €717 million in fiscal 2020, with its capital expenditures totaling some €67 million. For further information on PCC, go to: www.pcc.eu.

About the Fraunhofer Institute for Solar Energy Systems ISE

With a staff of 1300, the Fraunhofer Institute for Solar Energy Systems ISE in Freiburg, Germany is the largest solar energy research institute in Europe. Fraunhofer ISE is committed to promoting sustainable, economic, safe and socially just energy supply systems based on renewable energies. Its research provides the technological foundations for supplying energy efficiently and on an environmentally sound basis in industrialized, threshold and developing countries throughout the world. Focusing on energy efficiency, energy conversion, energy distribution and energy storage, the Institute develops materials, components, systems and processes in five business areas. One particular feature of Fraunhofer ISE is its excellent technical infrastructure, which is organized into eight laboratory centers and four technology evaluation centers providing testing and experimental services on a production scale. In addition, the Institute has several accredited testing facilities. The Institute is a member of the Fraunhofer-Gesellschaft, Europe's largest application-oriented research organization. For more information, visit us at www.ise.fraunhofer.de.

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