

MEDIA RELEASE

Planned automation of the inductive hot pressing of electrically conductive compound materials for the production of bipolar plates for the energy transition:

Follow-up project "UltraPress2" for process optimisation in fuel cell series production

Puchheim near Munich, March 2nd, 2022 – State-of-the-art technology developments are a prerequisite for the success of the energy transition and for achieving climate goals. In the already completed public funding project "UltraPress", the basis for an innovative hot pressing process with a tool made of ultra-high-strength concrete, which is called "Ultra-High Performance Concrete" (UHPC), has been created and its suitability has been proven. The research object is used for the production of graphite-based bipolar plates for NT-PEM fuel cells (low-temperature polymer electrolyte). By means of the implication of inductive temperature control, usual bottlenecks of hot pressing can be eliminated, for example the long cycle times and high power consumption due to required warm-up and cooling phases. The now initiated process with a pressing tool made of special concrete can hot press graphite-based bipolar plates within a few seconds. With regard to the high cost and time savings, the manufacturing process is to be further developed and converted into a series production in the follow-up project "UltraPress2". Since its official launch in October 2021, it has received four years of funding from the programme of the German Federal Ministry of Economics and Energy.

Direct partners belonging to the project consortium are "Proton Motor Fuel Cell GmbH", "Boyke Press Technology GmbH", "Eisenhuth GmbH & Co. KG", "Runkel Fertigteilebau GmbH" and the "Institute for Design and Production in Precision Engineering of the University of Stuttgart" (IKFF) plus the "Center for Fuel Cell Technology" (ZBT) as well as companies are associated such as "MC-Bauchemie Müller GmbH & Co. KG" and "eldec Induction GmbH". In the current "UltraPress2" approach, the inductive heating of the compound material – including the use of ultra-high-strength concrete as a pressing tool – is to be tracked. This combination enables fast heating and cooling cycles, whereby only a minimum of the steel mass is specifically heated compared to a conventional steel tool. In addition, a significant improvement in product quality can be achieved, to which the more homogeneous heating of the compound material caused by induction and the targeted control of solidification contribute.

New hot pressing process to be implemented in demonstration plant for production of bipolar plates

The focus of the research is on the component sizes of the two Proton Motor hydrogen fuel cells "PM 200" and "PM 400". With testing series at the cleantech specialist in Puchheim, the proprietary bipolar plate design is to be examined concerning final qualification. In addition, the ZBT expertise and the machinery in the field of hydraulic presses and hot pressing are to be expanded during the conveying period. For this purpose, a fully automatic laboratory press is procured, which enables the hot pressing of bipolar plates as well as close monitoring and optimisation. In addition to further reducing of process times as well as scaling of pressing tools, the project goal includes the implementation of the newly developed inductive hot pressing process in a demonstration plant for the automated and pre-series production of bipolar plates.

Project Partner:

| | |
|---|--------------------|
| Proton Motor Fuel Cell GmbH | Project Management |
| Boyke Press Technology GmbH | Partner |
| Institut für Konstruktion und Fertigung in der Feinwerktechnik - IKFF | Partner |
| Eisenhuth GmbH & Co. KG | Partner |
| Zentrum für BrennstoffzellenTechnik GmbH | Partner |
| Runkel Fertigteilebau GmbH | Partner |
| MC-Bauchemie Müller GmbH & Co. KG | Associated Partner |
| eldec Induction GmbH | Associated Partner |

Funding number and logos:

BMWi Projekt 03EN5010D



Gefördert durch:



Bundesministerium
für Wirtschaft
und Energie



aufgrund eines Beschlusses
des Deutschen Bundestages



About Proton Motor Fuel Cell GmbH (www.proton-motor.de):

For 25 years, Proton Motor has been Europe's specialist in climate-neutral energy generation with cleantech innovations and in this field, it has specialised in emission-free hydrogen fuel cells developed and manufactured in-house. The corporate focus is on stationary applications such as emergency power for critical infrastructures and mobile solutions such as back-to-base applications. In addition, the customised or standard hybrid systems are used in the automotive, maritime and rail sectors. The new automated series production plant was put into operation in September 2019.

In addition to CO2-neutral fuel cell solutions, the internationally active technology market leader from Bavaria also offers battery-powered uninterruptible power supply (UPS) via its "SPower" product line. The company, which currently employs more than 100 people under the CEO management of Dr Faiz Nahab, is a wholly owned operating subsidiary of "Proton Motor Power Systems plc", based in Newcastle upon Tyne, England. Since October 2006, the parent company's "green energy" share has been listed on the London Stock Exchange with simultaneous trading in Frankfurt/Main (ticker symbol: "PPS" / WKN: A0LC22 / ISIN: GB00B140Y116).

Point of contact at Proton Motor Fuel Cell GmbH, Benzstrasse 7, D-82178 Puchheim, www.proton-motor.de:

Ariane Guenther | Head of Public Relations
a.guenther@proton-motor.de
+49 / 89 / 127 62 65-96

Dr. Nils Baumann | Head of Fuel Cell Engineering
n.baumann@proton-motor.de
+49 / 89 / 127 62 65-77

Thomas Wannemacher | Team Leader Certification & Documentation
t.wannemacher@proton-motor.de
+49 / 89 / 127 62 65-60