

Project Information



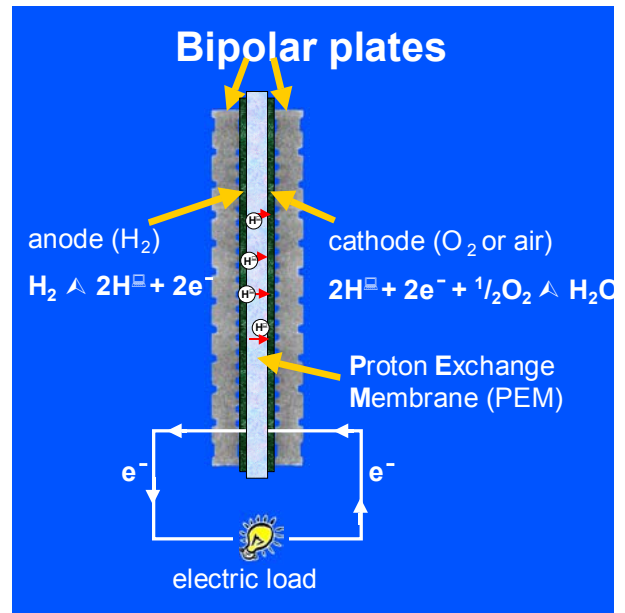
Subject: Development of a Production Technology for Bipolar Plates for PEM Fuel Cells

Applicant: Schunk Ingenieurkeramik GmbH
Hanns-Martin-Schleyer-Straße 5
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Duration: May 17, 2001 to February 28, 2004

Project Partners: Schunk Kohlenstofftechnik GmbH
Forschungszentrum Jülich GmbH
ZSW Ulm

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State at the beginning of the project

Bipolar plates are key components of PEM (Proton Exchange Membrane) fuel cell stacks. At the beginning of the project, the lack of cost-effective and reliable fuel cell stacks was the main obstacle to widespread market introduction of fuel cells as an alternative and efficient means for energy conversion. This situation was partly caused by the very complex and cost-intensive production of bipolar plates. The plates had been manufactured in single-piece production by milling technology out of composite materials (graphite and polymers). In order to achieve reproducible high class products, it has been necessary to develop an innovative manufacturing technology for bipolar plates based on graphite composite materials. This was done on the basis of known procedures such as injection molding and hot-pressing. In the course of the project materials based on thermoset and thermoplastic compounds have been investigated.

State of the project

During the project existing thermoset compounds have been optimized with respect to improved processing as well as to the required properties in cell operation. In addition, different mixtures have been manufactured by using thermoplastic binder systems and evaluated in diverse manufacturing processes regarding their suitability for a cost-effective production of bipolar plates with all required properties. The manufacturing technique for compounds has been scaled-up from laboratory to production quantities. During the project, a test stand for in-situ characterization of bipolar plate materials has been built at Schunk Kohlenstofftechnik GmbH. Pressing tools based on the project partner's design requirements for final parts have been realized. Using these tools, the reproducibility of the production technique, which has been selected by Schunk, has been proven. The project partner has integrated the plates made out of optimized compounds and tested them successfully.

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