

Fuel Cell System for Solar Boat Battery-Extender - BZ-BattExt -

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Abstract

For special applications Direct Methanol Fuel Cells (DMFC) are close to commercial application or already commercialized today. However for the step from laboratory to a broader market of fuel cells, significant cost reduction, as also an improvement in life time and power density of the systems is needed. These items were the focus of the project BZ-BattExt, to be reached by new knowledge in alternative materials, operation strategies as also the realisation of enhanced sub systems. This project is funded by the German Federal Ministry of Education and Research in the program of Micro fuel cells. In the project the feasibility of a micro-DMFC-system is evaluated which enables a minimised system periphery due to an improved system architecture. For this, alternative materials and functional components were developed and investigated. New membranes with reduced water and methanol permeation allow operation at low air stoichiometry, favourable for system efficiency. Gas diffusion layers of various compositions were tested and optimised material selected. New sealing materials with good methanol stability and optimized processibility in commercial production process were developed. MEA preparation was adapted to the new materials. The use of a simple, cost-effective way of stack production was demonstrated for DMFC use. The investigation and construction of enhanced subsystems and operation strategies, which enable and optimise the use of new components and materials, as also the realisation of the micro-DMFC-system is a focus of the project. The technical feasibility of the results is investigated application oriented, which means it is tested as battery extender of a solar boat. The fuel cell system serves as a basis for an efficient, compact and cost effective micro-DMFC-System as alternative for battery- or battery-extender systems which covers a broad variety of applications.

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