The fuel cell group of Fraunhofer Institute for Chemical Technology (IC) in Pfinztal, Germany develops and characterizes materials for PEM, HT-PEM and alcohol fuel cells as well as PEM fuel cell systems. The research takes place mainly in the framework of national and international projects with leading research institutions and international companies, as well as in contract by the German Ministry of Defence.

The catalyst development focuses on acidic and alkaline alcohol fuel cells, PEM fuel cells and electrolysis and sulfur tolerant catalysts for HT-PEM fuel cells. For the characterization of materials, a wide variety of equipment is available, such as online mass spectrometry, differential electrochemical mass spectrometry (DEMS) highlighting a test cell for DEMS measurements under HT-PEMFC conditions, rotating electrode techniques ((R)RDE) and single cell test benches e.g. for MEA performance and durability investigations including a test bed with inline mass spectrometric CO₂ detection for carbon corrosion quantification. Moreover, facilities and experience of electrode and MEA fabrication based on spraying techniques are available. The system development focuses on (HT-)PEM fuel cell systems for range extender/APU applications as well as closed systems for underwater usage operating with pure oxygen. The system development also covers the characterization of fuel cell stacks, Hardware in the Loop system built-up and the simulation of the respective environment.

**Figure 1:** 10 W direct methanol fuel cell system demonstrator

**Figure 2:** Fuel cell test bench for differential electrochemical mass spectrometry measurements on single cells

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