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Flexible Pressure, Temperature, and Flow Microsensors for Integration in Methanol Microreformer

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In recent years, the development of fuel cells has proceeded rapidly, and so the reformation of methanol to produce hydrogen has become a serious problem. Supplying hydrogen from a methanol microreformer to fuel cells is an important topic. The structure of a microflow channel must support the transfer of external heat to the reform reaction, facilitating the diffusion of methanol vapor into the catalyst layer, thereby increasing the rate of transfer of hydrogen. In this investigation, the micro-electro-mechanical systems (MEMS) technique is utilized to fabricate pressure, temperature, and flow microsensors. Polyimide film (PI) exhibits high temperature resistance and stress corrosion resistance, and is adopted herein as a flexible substrate. Multifunctional microsensors are inserted into methanol microreformers to measure the internal pressure, temperature, and flow *in situ*, and the signals thus obtained are used to improve their efficiency.

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