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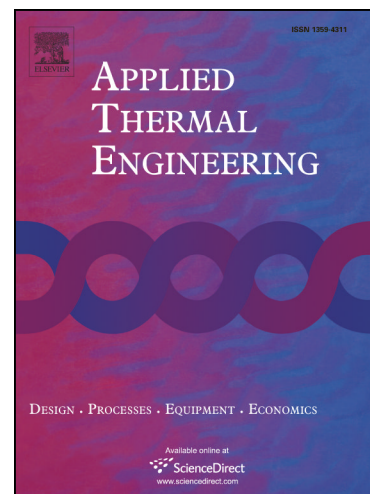
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Transport of highly concentrated fuel in direct methanol fuel cells

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Abstract:

It is desirable to operate a direct methanol fuel cell (DMFC) with highly concentrated fuel to increase the specific energy of the fuel cell system; thus it could have a longer runtime. The high-concentration operation requires the large methanol concentration gradient across the transport path from fuel reservoir to the catalyst layer, including fuel reservoir, fuel reservoir/current collector interface, current collector, backing layer and micro-porous layer. In this work, we create the large methanol concentration gradient through lowering the porosity of the backing layer with nanosized carbon powder. The performance tests show that the use of the present backing layer enables the passive DMFC to operate with a high-concentration fuel up to 10.0 M without increasing the methanol crossover rate.

Keywords: Passive DMFC; Concentrated fuel; Methanol crossover; Anode backing layer

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