

## Micro fuel cell with the nanogap channel polymer electrolyte membrane based on fully conventional semiconductor processing

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Currently, there has been increasing research interest in micro power sources for portable and autonomous micro systems drives research on micro fuel cell systems as a key component of micro power generation system. In order to form monolithic type fuel cell, thin film type proton exchange membrane which consists of micro-structure arrays and sulfonated fluorocarbon films, was developed in this work. The Si based microstructures were used to increase the surface area of the effective proton exchange membrane. Furthermore, the deposited membrane on the Si based microstructures could generate the nanogap channels in the range from 100nm to 200nm. Finally, Pt catalytic could be formed by thermal evaporator system, and fuels were supplied through micro-channels formed by polydimethylsiloxane (PDMS). Therefore, the developed micro fuel cell is fully compatible with the conventional semiconductor technology. The performance of novel micro fuel cell was evaluated under CH<sub>3</sub>OH and KMnO<sub>4</sub> flow using Potentiostat.