

## Fabrication of Novel micro fuel cell based on fully conventional semiconductor processing

김진태<sup>1</sup>, 임연호<sup>1,2,\*</sup>, 여찬혁<sup>2</sup>, Khan Mohammad Rizwan<sup>1</sup>,  
조규형<sup>2</sup>

<sup>1</sup>전북대학교 반도체화학공학부;

<sup>2</sup>전북대학교 수소연료전지공학과

(yeonhoim@chonbuk.ac.kr\*)

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. The goal of this work is to develop novel monolithic type microfuel cell based on conventional semiconductor processing. In order to form monolithic type fuel cell, which consists of micro-pillar arrays and sulfonated fluorocarbon films, was developed. In the first step, Si micro-pillar structures were used to increase the surface area of the effective proton exchange membrane.. The proton conductivities of the synthesized membrane were evaluated as functions of temperature and humidity. Finally, Pt catalytic electrodes could be formed by the conventional lift-off process, and fuels were supplied through micro-channels formed by polydimethylsiloxane (PDMS) mold. It is worthwhile that the developed microfuel cell is fully compatible with the conventional semiconductor technology. The performance of novel microfuel cell was evaluated under HCl and KMnO<sub>4</sub> flow using Potentiostat.