

## **Optimization of hot pressing parameters in membrane electrode assembly fabrication by response surface method**

### **Abstract**

The aim of this research was to study the effect of the membrane electrode assembly fabrication factors on the performance of a passive micro direct methanol fuel cell by studying the hot pressing parameters. The MEA was prepared with a Nafion 117 membrane and porous electrodes having an active area of 1 cm<sup>2</sup> with Pt and Pt/Ru catalysts of 8 mg cm<sup>-2</sup> loading at the cathode side and anode side, respectively. The Design of Experiment work was performed with the Response Surface Method using the Central Composite Design. The One-factor-at-a-time method was used to select the significant level of factors for the DOE method, which are temperature in the range of 100-135 C and pressure in the range of 6.0-16.0 kgf cm<sup>-2</sup>. The results show that the proposed mathematical model in the Response Surface Method can be used adequately for prediction and optimization within the factor levels investigated. The combined optimum hot pressing parameters that gave the highest performance of 7.23 mW cm<sup>-2</sup> predicted in this study are temperature 130 C and pressure 6 kgf cm<sup>-2</sup>.

### **Keywords**

Design of Experiment; DMFC; MEA; Nafion; Response surface method