

Preparation of porosity-graded micro porous layer (MPL) for proton exchange membrane fuel cell (PEMFC)

전정환, 조동현, 이지영, 김성현*
고려대학교 화공생명공학과
(crashwan@korea.ac.kr*)

In this study, a porosity-graded micro porous layer (MPL) was prepared using the double coating method to enhance the water removal ability of the gas diffusion layer (GDL). In the double MPL, the porosity of each layer was controlled using thermal expandable graphite (TEG), which could produce pores in MPL through thermal expansibility. The porosity of the inner layer of the porosity-graded MPL was smaller than the outer layer, so the gradient direction in porosity was from the MPL/catalyst layer interface to the GDBL/MPL interface. In addition, the pore forming ability of TEG and the water removal ability of porosity-graded MPL was characterized. The performance of the porosity-graded MPL was evaluated and compared to the single layer conventional MPL. The porosity-gradient structure in MPL increased the water permeability of GDL and the performance of the single cell in the high current density region. Since the porosity-graded MPL increased the water removal ability of GDL, concentration loss due to water flooding in the high current density region was decreased.