Research of the large-area Catalyst layer manufacturing technique in Proton exchange membrane fuel cell

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A proton exchange membrane fuel cell (PEMFC) is not only highly efficient device but also eco-friendly energy-conversion device, which is expected as one of the most promising alternatives to conventional fossil fuel. However, despite many research on PEMFC, the manufacturing technique of large-area catalyst layer because membrane swelling during making is still insufficiently explored. In this study, the 300 cm2 large-area catalyst layer in membrane electrode assembly (MEA) are prepared via dual-nozzle method that consist of air spray outer and electro spinning deposition inner for reduce membrane swelling. As a result, the performance of the large-area MEA and the conventional MEA was similar, and the scanning electron microscope (SEM) and cross-section SEM proceeded for compare their structure. In addition, the electrochemical impedance spectroscopy was further examined to investigate the relation between the scale-up MEA resistant and the conventional MEA resistant.