Fabrication and evaluation of MEA with electrodes prepared by electrostatic spray deposition on membrane

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To achieve ultra low Pt loading and high Pt utilization, catalyst layers were prepared by electrostatic spray deposition (ESD) on membrane. ESD is a process that an aerosol of a solution is ejected from metal syringe nozzle with a high applied voltage to a thin film on the counter electrode. The catalyst ink containing Pt/C particles was successfully atomized and deposited under the applied electric field. Thus, the nanostructured fractal surface morphologies and a good porosity were obtained by using ESD method. As a result, the Pt/C and binding polymer agglomerates were deposited over the membrane. In this paper, the catalyst layer with Pt loading 0.07 mg/cm2 was deposited by ESD method. A good performance (1.0 A/cm^2 at 0.5 V, 70 ℃ and 0.07 mg_{Pt}/cm^2) was achieved by using ESD method. In the Pt loading 0.07 mg/cm^2, a performance was increased by roughly 2 times compared with spraying method.
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