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Electrode Preparation of PEMFC Using Plasma Sputtering Technique
플라즈마 스퍼터 기술을 이용한 고체고분자전해질연료전지의 전극제조

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A method for fabricating the electrode of PEMFC has been developed in which platinum catalyst is directly deposited on the membrane surface using sputtering technique. The performance of PEMFC using this electrode was evaluated examining such data as i-V curves and impedance spectra. These electrodes showed a remarkable improvement over the electrodes prepared by traditional methods in the utilization efficiency defined as the utilizable portion of the total mass of the platinum catalyst. The efficiency by the sputtering method was about 10 times higher than that by the conventional methods. This is equivalent to loading level of 0.043 mg Pt cm^{-2}. Carbon/Nafion ink coated on the bare Nafion surface prior to the sputtering deposition greatly enhanced the efficiency. The impedance spectra of the electrodes prepared by this sputtering method did not show the lower frequency distortion, which reflects the mass transport limitations. Also presented in this paper are the performances of the electrodes fabricated by conventional methods. By comparing these results the functional advantages of the new type of electrodes are discussed.