가정용 연료전지 시스템의 연료/공기 이용률 최적화

*석 동훈, **김 민진, 이 진호

Optimization of Anodic/cathodic Utilization for a Residential Power Generation System

*Donghun Seok, **Minjin Kim, Jinho Lee

To obtain higher power efficiency of Residential Power Generation System(RPG), it is needed to operate system on optimized stoichiometric ratio of fuel and air. In this paper, optimizing stoichiometric ratio of fuel/air is conducted through systematic experiments and modeling. Based on fundamental principles and experimental data, constraints are chosen. Using these stoichiometric ratios as decision variables, maximum power efficiency of system could be found. As a result of research, power efficiency of RPG system is improved.

Key words : Residential Power Generation(가정용 연료전지 시스템), Stoichiometric Ratio(화학 양론비), Optimization(최적화), Power Efficiency(전기효율)

E-mail : *seok6832@kier.re.kr, **minjin@kier.re.kr

연료전지 백금–루테늄 나노입자의 전기화학적 거동에 대한 탄소지지체의 활성화 효과

*김 병주, **박 수진

Influence of Chemical Activation of Carbon Supports on Electrochemical Behaviors of Pt-Ru Nanoparticle for Fuel cells

*Byung-Ju Kim, **Soo-Jin Park

In this work, graphite nanofibers (GNFs) were prepared for using catalyst supports in fuel cells. The GNFs were chemically activated to obtain high surface area and small pore diameter with different potassium hydroxide (KOH) amounts, i.e., 0, 1, 3, 4, and 5 g as an activating agent. And then Pt-Ru was deposited onto activated GNFs (A-GNFs) by chemical reduction method. The characteristics of Pt-Ru catalysts deposited onto A-GNFs were determined by specific surface area and pore size analyzer, X-ray diffraction (XRD), transmission electron microscopy (TEM), and inductive coupled plasma-mass spectrometer (ICP-MS). The electrochemical properties of Pt-Ru/A-GNFs catalysts were also analyzed by cyclic voltammetry (CV) experiments. From the results, the A-GNFs carbon supports activated with 4 g of KOH (A4g-GNFs) showed that the highest specific surface areas. In addition, the A4g-GNFs led to uniform dispersion of Pt-Ru onto A4g-GNFs, resulting in the enhancement of electrochemical activity of Pt-Ru catalysts.

Key words : Pt-Ru nanoparticle(백금-루테튬 나노입자), Carbon supports(탄소지지체), Chemical activation(화학적 활성화), Electrochemical behavior(전기화학적 거동)

E-mail : *bagjigosa@hanmail.net, sjpark@inha.ac.kr