탄소지지체의 화학적 변형에 따른 연료전지용 백금-루테늄 촉매의 전기화학적 활성의 영향

*김 병주, **박 수진

Effect of Chemical Modification of Carbon Supports on Electrochemical Activities for Pt-Ru Catalysts of Fuel Cells

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

In this work, ordered mesoporous carbons (OMCs) were prepared by the conventional templating method using mesoporous silica (SBA-15) for Pt-Ru catalyst supports in fuel cells. The influence of surface modification on carbon supports on the electrochemical activities of Pt-Ru/OMCs was investigated with different pH. The neutral-treated OMCs (N-OMCs), base-treated OMCs (B-OMCs), and acid-treated OMCs (A-OMCs) were prepared by treating OMCs with 2 M C_6H_6,2 M KOH, and 2 M H_3PO_4, respectively. The surface characteristic of the carbon supports were determined X-ray photoelectron spectroscopy (XPS). The electrochemical activities of the Pt-Ru catalysts had been enhanced when the OMCs supports were treated by basic or neutral agents, while the electrochemical activities had been decayed for the A-OMCs supported Pt-Ru.

Key words : Pt-Ru catalysts(백금-루테튬 촉매), Orderd mesoporous carbons(중형기공탄소), Chemical modification(화학적 개질), Electrochemical activities(전기화학적 활성)

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

다중 기능성 그룹을 포함하는 마이크로포어 탄소의 합성 및 전기화학적 특성

*김 기석, **박 수진

Synthesis of microporous carbons containing multi-functional groups and their electrochemical performance

*Ki-Seok Kim, **Soo-Jin Park

In this work, multi-functional groups, i.e., nitrogen and oxygen, contained microporous carbons (MF-MCs) were prepared by the one step carbonization of the poly(vinylidene chloride-co-acrylonitrile-co-methyl methacryalte) (PVDC-AN-MMA) without activation. The electrochemical performance of MF-MCs was investigated as a function of carbonization temperature. It was found that MF-MCs had a high specific surface area over 800 m^2/g without additional activation, resulting from the micropore's formation by the release of chlorine groups. In addition, although functional groups decreased, specific surface area was increased with increasing carbonization temperature, leading to the enhanced electrochemical performance. The pore size of the carbon distributed mainly in small micropore of 1.5 to 2 nm, which was idal for aqueous electrolyte. Indeed, the unique microstructure features, i.e. high specific surface area and optimized pore size provided high energy storage capability of MF-MCs. These results indicated that the microporous features of MF-MCs lead to feasible electron transfer during charge/discharge duration and the presence of nitrogen and oxygen groups on the MF-MCs electrode led to a pseudocapacitive reaction.

Key words : Microporous carbon(마이크로포어 탄소), Multi-functional groups(다중 기능성 그룹), Activation(활성화), Electrochemical performance(전기화학적 특성)

E-mail : *kimks@inha.ac.kr, **sjpark@inha.ac.kr