

Low temperature preparation of Pt alloy electrocatalysts for DMFC

*Minwu Song, KyeongSeop Lee, Young-Soon Kim, **Hyung-Shik Shin

Energy Materials & Surface Science Laboratory, Solar Energy Research Center
School of Chemical Engineering, Chonbuk National University, Jeonju 561-756, Republic of Korea

Abstract

The electrodes are usually made of a porous mixture of carbon-supported platinum and ionomers. SnO₂ particles provide as supports that have been used for DMFCs, and it have high catalytic activities toward methanol oxidation. The main advantage of SnO₂ supported electrodes is that it has strong chemical interactions with metallic components. The high activity to a synergistic bifunctional mechanism in which Pt provides the adsorption sites for CO, while oxygen adsorbs dissociative on SnO₂. The reaction between the adsorbed species occurs at the Pt/SnO₂ boundary. The morphological observations were characterized by FESEM and transmission electron microscopy (TEM). SnO₂ particles crystallinity was analyzed by the X-ray diffraction (XRD). The surface bonded state of the SnO₂ particles and electrode materials were observed by the X-ray photoelectron spectroscopy (XPS). The electric properties of the Pt/SnO₂ catalyst for methanol oxidation have been investigated by the cyclic voltametry (CV) in 0.1M H₂SO₄ and 0.1M MeOH aqueous solution. The peak current density of methanol oxidation was increased as the SnO₂ content in the anode catalysts increased. Pt/SnO₂ catalysts improve the removal of CO ads species formed on the platinum surface during methanol electro-oxidation.

Key words : Pt alloy, anode electrode, catalyst, DMFC

** Author to whom all correspondence should be addressed.

E-mail: hsshin@chonbuk.ac.kr, Phone +82-63-270-2438, Fax: +82-63-270-2306