World Academy of Science, Engineering and Technology International Journal of Chemical and Materials Engineering Vol:9, No:05, 2015

ORR Activity and Stability of Pt-Based Electrocatalysts in PEM Fuel Cell

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Abstract : A comparison of activity and stability of the as-formed Pt/C, Pt-Co, and Pt-Pd/C electrocatalysts, prepared by a combined approach of impregnation and seeding, was performed. According to the activity test in a single proton exchange membrane (PEM) fuel cell, the oxygen reduction reaction (ORR) activity of the Pt-M/C electro catalyst was slightly lower than that of Pt/C. The j0.9 V and E10 mA/cm2 of the as-prepared electrocatalysts increased in the order of Pt/C>Pt-Co/C>Pt-Pd/C. However, in the medium-to-high current density region, Pt-Pd/C exhibited the best performance. With regard to their stability in a 0.5 M H2SO4 electrolyte solution, the electro chemical surface area decreased as the number of rounds of repetitive potential cycling increased due to the dissolution of the metals within the catalyst structure. For long-term measurement, Pt-Pd/C was the most stable than the other three electrocatalysts.

Keywords: ORR activity, stability, Pt-based electrocatalysts, PEM fuel cell

Conference Title: ICCCE 2015: International Conference on Chemistry and Chemical Engineering

Conference Location : Amsterdam, Netherlands

Conference Dates: May 14-15, 2015