

Enhanced Modification Effect of CeO₂ on Pt-Pd Binary Catalysts for Formic Acid Oxidation

Authors : Azeem Ur Rehman, Asma Tayyaba

Abstract : This article deals with the promotional effects of CeO₂ on PtPd/CeO₂-OMC electro catalysts. The synthesized catalysts are characterized using different physico chemical techniques and evaluated in a formic acid oxidation fuel cell. N₂ adsorption/desorption analysis shows that CeO₂ modification increases the surface area of OMC from 1005 m²/g to 1119 m²/g. SEM, XRD and TEM analysis reveal that the presence of CeO₂ enhances the active metal(s) dispersion on the CeO₂-OMC surface. The average particle size of the dispersed metal decreases with the increase of Pt/Pd ratio on CeO₂-OMC support. Cyclic voltammetry measurement of Pd/CeO₂-OMC gives 12 % higher anodic current activity with 83 mV negative shift of the peak potential as compared to unmodified Pd/OMC. In bimetallic catalysts, the addition of Pt improves the activity and stability of the catalysts significantly. Among the bimetallic samples, Pd₃Pt₁/CeO₂-OMC displays superior current density (74.6 mA/cm²), which is 28.3 times higher than that of Pt/CeO₂-OMC. It also shows higher stability in extended period of runs with least indication of CO poisoning effects.

Keywords : CeO₂, ordered mesoporous carbon (OMC), electro catalyst, formic acid fuel cell

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

Conference Location : Amsterdam, Netherlands

Conference Dates : May 14-15, 2015