

## Modification Effect of CeO<sub>2</sub> on Pt-Pd Nano Sized Catalysts for Formic Acid Oxidation

**Authors :** Ateeq Ur Rehman

**Abstract :** This article deals with the promotional effects of CeO<sub>2</sub> on PtPd/CeO<sub>2</sub>-OMC electrocatalysts. The synthesized catalysts are characterized using different physicochemical techniques and evaluated in a formic acid oxidation fuel cell. N<sub>2</sub> adsorption/desorption analysis shows that CeO<sub>2</sub> modification increases the surface area of OMC from 1005 m<sup>2</sup>/g to 1119 m<sup>2</sup>/g. SEM, XRD and TEM analysis reveal that the presence of CeO<sub>2</sub> enhances the active metal(s) dispersion on the CeO<sub>2</sub>-OMC surface. The average particle size of the dispersed metal decreases with the increase of Pt/Pd ratio on CeO<sub>2</sub>-OMC support. Cyclic voltammetry measurement of Pd/CeO<sub>2</sub>-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, Pd<sub>3</sub>Pt<sub>1</sub>/CeO<sub>2</sub>-OMC displays superior current density (74.6 mA/cm<sup>2</sup>), which is 28.3 times higher than that of Pt/CeO<sub>2</sub>-OMC. It also shows higher stability in extended period of runs with least indication of CO poisoning effects.

**Keywords :** CeO<sub>2</sub>, ordered mesoporous carbon (OMC), nano particles, formic acid fuel cell

**Conference Title :** ICCMS 2015 : International Conference on Chemistry and Materials Science

**Conference Location :** Zurich, Switzerland

**Conference Dates :** July 29-30, 2015