

PEMFC catalyst durability enhancement by using silica-coated CNF as catalyst support

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Carbon supported platinum is widely used as a cathode catalyst in a fuel cell. However, under the cathodic harsh condition, carbon support becomes corroded which directly affect platinum agglomeration and detachment. In the present study, PCNF was coated with different thickness of silica by successive hydrolysis of APTES and TEOS. The hydrolysis of the only APTES results in very thin layers whereas the APTES and TEOS results in thick layers. In terms of durability and electrochemical conductivity, both thin and thick layer are not favorable as an electrocatalyst in a fuel cell. Platinum nanoparticles were then deposited on the silica coated PCNF. Physical and electrochemical properties of PCNF/SiO₂/Pt catalyst were studied by TEM, TGA, nitrogen isotherm, X-ray diffraction and CV. Finally, Pt/PCNF/SiO₂ electro-catalyst (where silica layer deposited on Pt/PCNF) was also compared with PCNF/SiO₂/Pt.