179b Oriented Multi-Walled Carbon Nanotubes Film as Cathode Catalyst Support for Pemfc

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In this presentation, we reported a simple filtration method to prepare an oriented multi-walled carbon nanotubes (MWNTs) film based cathode catalyst for proton exchange membrane fuel cell (PEMFC). A polyol method was used to prepare high dispersed Pt/MWNTs catalyst with smaller Pt nanoparticles (2.6 nm) and a high metal loading (30 wt.%). The Pt/MWNTs suspension was drawn directly through a 0.2-um-pore hydrophilic Nylon filter paper and then transferred onto Nafion membrane. SEM shows the Pt/MWNTs film with a thickness of 5 um is partially vertical to the membrane. The contact angle of Pt/MWNTs film onto Nafion membrane is 151.7o, which is higher than Pt/C mixed with PTFE catalyst layer (147.2o). This suggests the Pt/MWNTs film has a super-hydrophobicity. PEMFC with the oriented CNTs film as cathode achieves higher single cell performance than those carbon black and disordered CNTs film based cathode probably due to the enhanced electrocatalytic activity of Pt/MWNTs and improved mass transport with the oriented super-hydrophobic film.