Development of catalyst with titanium dioxide support materials for PEMFC electrode

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The main catalyst support material at the PEMFC electrode is carbon. However, it has shortcornings that carbon supports can be corroded under the harsh operating environment and it leads to the platinum particles agglomerate and sinter together on the carbon support via passive diffusion process. Therefore, highly stable catalyst support materials need to be developed to improve the overall durability. TiO has received extensive attention owing to the excellent chemical and mechanical stability in oxidative and acidic environments. But, TiO materials suffer from one major disadvantage of low electrical conductivity that hinder their direct use in fuel cells. In this paper, we have modified a TiO nanofiber with a different amount of carbon nanotube(CNT). CNT - TiO nanofiber composite shows high catalytic activity due to the elimination of the drawback associated with the poor electrical conductivity of TiO . Scanning electron microscopy (SEM), transmission electron microscopy (TEM) and X-Ray Diffraction(XRD) were employed to characterize the morphology and structure of the materials. The performance of the prepared materials was evaluated by measuring the current -voltage(IV) characteristics, electrode impedance and cyclic voltammetry (CV).