

# Study of Carbon Nanomaterials as cathode electrode for DMFC

## Abstract

High surface area carbon nanomaterials were used as cathode electrode for direct methanol fuel cell(DMFC).First, iron catalysts were deposited on carbon cloth for growing carbon nanomaterial by IBSD. Then MWCNT and nanoflake which are supports for DMFC cathode catalyst have been growth directly on the surface of carbon cloth by MPECVD method. Physical sputtering and Polyol methods were chosen for dispersing Pt catalysts on carbon nanomaterial. The amount of Pt particles are controlled by changing deposition time and solution concentration. SEM and TEM were used to observe the morphologies and structures of Pt particles adsorbed on carbon cloth. And we use XRD and EDX for calculating Pt particle size and weight percentage. Cyclic voltammety (CV) in 0.5M H<sub>2</sub>SO<sub>4</sub> solution shows the adsorption and desorption behavior of hydrogen ion on Pt particles ,which can be used to calculate the effective surface area of Pt particles. And CV is also used to measure the redox current in 0.5M H<sub>2</sub>SO<sub>4</sub> and 1M CH<sub>3</sub>OH mixed solution. With the results, the influence of different catalyst deposition methods on the active ability of Pt catalyst can be obtained. Compared to chemical solution redox, Pt particles sputtered on CNT shows larger effective surface area and oxidation current .This also suggests that MWCNT on carbon cloth are suitable for the cathode catalyst support for DMFC.