Characteristics of direct methanol fuel cell electrode using fibrious materials as catalyst supports

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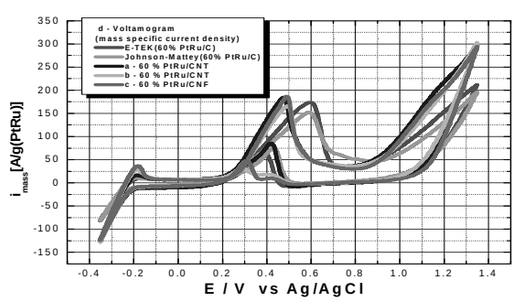
Anode catalysts of direct methanol fuel cell should have small particle size and high dispersion of platinum so accelerate methanol oxidation reaction at the interface between methanol and platinum particles. Carbon nanotube and carbon nanofiber are suitable to catalyst supports for direct methanol fuel cells, because of their high mechanical and thermal stability and electrical conductivity.

We prepared anode catalysts with cup-structure carbon nanotubes having diameter under 50nm and herringbone-structure carbon nanofibers having diameter over 50nm. For pre-treatment we carried out dispersion process to relax bundle morphology, refining with water, acid treatment and heat treatment. In order to optimize platinum particle size and improve dispersion property, we used common impregnation method as four processes. The first is reduction method using a reducing agent, the second is reduction after adjustment at PH.ca=8 using



NaOH, the third is the method using a dispersion agent that is added one process to the first one and the last is synthetic process using NaOH titration at PH.ca=8, the dispersion agent, reduction method. The result of Cyclic Voltamogram of fourth process is a-catalyst mass specific current density: 144 A/g(PtRu), b-catalyst mass specific current density: 118.5 A/g(PtRu), c-catalyst mass specific current density: 130.5 A/g(PtRu) at 0.4V(room temperature) respectively, so it showed the best performance of all processes.

Fig. The Cyclic Voltamogram of 60%PtRu/CNT, 60%PtRu/CNF catalyst,Impregnation method 4 process step