

## Syntheses and Performances of Supported Catalysts for Direct Methanol Fuel Cell

직접 메탄올 연료전지를 위한 담지 촉매의 제조 및 성능 연구

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There has been continuous effort to develop the new catalyst systems and to increase the efficiency of Pt and Pt alloy, which are the most popular electrocatalysts recommended for low-temperature fuel cell systems such as direct methanol fuel cell (DMFC).

Carbon-supported Pt catalyst with high loading for cathode in DMFC is requested to increase the efficiency of Pt utilization and to reduce the amount of Pt in the electrode compared to the Pt black catalyst. However, particle size of Pt usually increased with platinum loading. For example, particle size of Pt in the commercial catalyst from E-TEK is showed exponential increasing with metal content.

In this presentation, the highly dispersed carbon-supported Pt catalysts were synthesized by gas reduction method followed by modified impregnation process. Uniformly distributed and highly loaded catalyst particle were obtained on the high surface area carbon black and novel structure of mesoporous carbon. For example, 60 wt% of Pt on carbon was prepared with the particle size of  $\sim 3$  nm with less agglomeration as shown in the Figure below. The electrochemical performance of DMFC using catalysts developed in this process as cathode catalyst showed the improvement compared to the Pt black catalyst, which is commonly used for DMFC cathode.

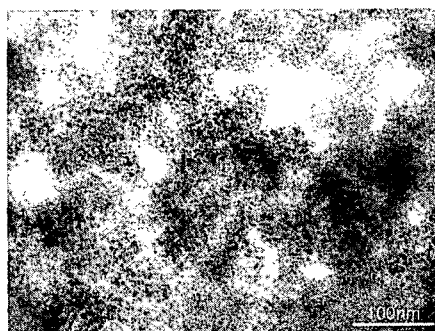


Figure. TEM of 60wt.% Pt on carbon support by a novel process