

## **Electro-catalytic Performance of PtRu Catalysts Supported on Urea-treated MWNTs for Methanol Oxidation**

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**Abstract:** In this work, nitrogen and oxygen functionalities was introduced to the graphite nanofibers (GNFs) and their effect on electrocatalytic performance of the GNF supports for direct methanol fuel cells (DMFCs) was investigated. The nitrogen and oxygen groups were introduced through the urea treatments and acid treatment, respectively. And, PtRu catalysts deposited on modified GNFs were prepared by a chemical reduction method. The catalysts were characterized by means of elemental analysis, nitrogen adsorption, and X-ray photoelectron spectroscopy (XPS). The structure and morphological characteristics of the catalysts were characterized by X-ray diffraction (XRD) and transmission electron microscopy (TEM). As a result, the Pt-Ru nanoparticles were impregnated on GNFs with good formation in 3-5 nm. And, the cyclic voltammograms for methanol oxidation revealed that the methanol oxidation peak varied depending on changes of surface functional groups. It was thus considered that the PtRu deposition was related to the reduction of PtRu and surface characteristics of the carbon supports. The changes of surface functional groups were related to PtRu reduction, significantly affect the methanol oxidation activity of anode electrocatalysts in DMFCs.

**Key words:** graphite nanofibers, fuel cells, PtRu catalysts, methanol oxidation