Hydrogen Adsorption Properties of Multi-walled Carbon Nanotubes by Fluorine Plasma Treatment

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Hydrogen storage on carbon materials has been attracting attention because of the importance of hydrogen as an ideal substitute for fossil fuels. Recently, single-walled carbon nanotubes (SWCNTs) and multi-walled carbon nanotubes (MWCNTs) were reported to be very promising candidates for H2 adsorption. In this experiment, hydrogen adsorption of MWCNTs was investigated under moderate pressure at room temperature. The effect of plasma treatments on the hydrogen adsorption of carbon nanotubes was discussed. Subsequently, the thermal stability was invesitigated by a thermogravimetric analysis (TGA) measurement. The Brunauer-Emmett-Teller (BET) equation was used to calculate the specific surface area of the CNTs. The surface characteristics of the carbon nanotubes were determined by fourier transformed - infrared (FT-IR) and X-ray photoelectron spectroscopy (XPS). The present experiment indicated that the amount of hydrogen adsorbed on carbon nanotubes was increased by fluorine plasma treatment.