Structural Analysis of Carboxylic Acid-Functionalized Multi-walled Carbon Nanotubes

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Abstract : Carboxylated multi-walled carbon nanotubes (MWNTs) were in detail characterized by XRD, XPS, FTIR, and thermogravimetric measurements. Carboxylic acid groups were functionalized to MWNTs using aqueous acid solutions. The change of sonication and reflux conditions rarely influenced the degree of carboxylation on MWNTs, but reduced the thermal stability of the resulting carboxylated MWNTs. The characteristic Bragg peaks of pristine and carboxylated MWNTs were analyzed by XRD measurements. After acid treatment the diffraction peaks (100), (101), and (102) of pristine MWNTs disappeared, but the diffraction peak (002) was preserved in the carboxylated MWNTs. The introduction of carboxylic acid groups on MWNTs caused to improve the dispersibility of the resulting carboxylated MWNTs in water.

Key Words : carbon nanotubes, surface modification, thin film