

Characterization of amide and ester functionalized multiwalled carbon nanotubes

ABSTRACT

Multi-walled carbon nanotubes (MWCNT) were functionalized by different functional group via amidation and esterification process. The MWCNT were treated with H₂SO₄/HNO₃ first to introduce carboxylic acid functional group on the surface of MWCNT. This carboxylic group was used as reaction precursor in the functionalization. There are two functionalizing reactant were used which is dodecylamine, CH₃(CH₂)₁₁NH₂ and 1-octadecanol, CH₃(CH₂)₁₇OH. Electron microscopy revealed that the morphology of amide and ester functionalized MWCNT exhibit decrease in their diameter size due to insertion of amide and ester functional group. Raman measurements showed that G-band (graphitic structure) of amide and ester functionalized MWCNT slightly shifted downfield about 6-8 cm⁻¹ due to presence of new functional group on the surface of MWCNT. Multi-walled carbon nanotubes attached to organofunctional element have greater flexibility for further usage in various application fields such as nanocomposite material, biology and chemical sensor and environmental monitoring.

Keyword: Multi-walled carbon nanotubes; Amidation; Esterification; FESEM-EDX analysis