

Modification of single-walled carbon nanotubes by ammonium sulfamate

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Because of their unique symmetry and special electronic, mechanical and chemical properties, single-walled carbon nanotubes (SWNTs) have been the subject of intense research once being discovered [1]. Among their many potential applications, especially in the field of nano electronics, soluble and individual SWNTs are indispensable. It has been approved that chemical modification is an efficient approach to obtain such kind of SWNTs [2, 3].

SWNTs prepared by arc discharge were oxidized by ammonium persulfate, which led to carboxyl groups on the surface of the tubes. Then, the oxidized SWNTs were further modified with ammonium sulfamate through a condensation reaction taken place between the carboxyl groups on tubes and the amide group of ammonium sulfamate. The modified SWNTs are highly water-soluble and stable. Raman spectrum and UV-vis-NIR absorption spectrum show that the above procedure does not change the electronic structures of single-walled carbon nanotubes. Moreover, the infrared spectrum confirms the formation of amide bond between ammonium sulfamate and carbon nanotubes. Such water-soluble single-walled carbon nanotubes might be applicable in nano electronics as well as in biochemistry and biomedicine.

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