

论文

聚苯乙烯修饰碳纳米管表面的研究

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摘要:

利用原子转移自由基聚合方法合成了端基具有一个卤素的聚苯乙烯, 并通过叠氮化反应得到端基为叠氮基团的聚苯乙烯. 利用叠氮基与单壁或复壁碳纳米管的反应, 将聚苯乙烯接到碳纳米管的表面上, 实现了碳纳米管的化学修饰. 通过FTIR, XPS, TEM, UV和Raman光谱等技术证明了聚苯乙烯以共价键形式结合到碳纳米管表面上. 利用TGA估算出连接在碳纳米管上的聚苯乙烯的含量, 并推测出复壁碳纳米管中较多的结构缺陷更有利于聚合物的接枝.

关键词: 碳纳米管; 聚苯乙烯; 化学修饰; 叠氮化; 原子转移自由基聚合

Studies on Carbon Nanotube Surface Modified with Polystyrene

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Abstract:

Polystyrene with a halogen atom at the chain end was prepared by means of atom transfer radical polymerization(ATRP). Then polystyrene with an azide group at the chain end was obtained through the azidization reaction. Finally, PSt was connected to the surface of carbon nanotube by the reaction of azide group with single walled carbon nanotube(SWNT) or multi-walled carbon nanotube(MWNT) and the chemical modification of CNT was realized. The characterizing results of FTIR, XPS, UV, Raman spectrum and TEM show that the PSt was combined assuredly with carbon nanotube by the covalent bond. According to the results of TGA mensuration, the content of PSt on the surface of SWNT and MWNT is respectively estimated and more defects in structure of MWNT are favorable for chemical modification of CNTs.

Keywords: Carbon nanotube Polystyrene Chemical modification Azidization Atom transfer radical polymerization(ATRP)

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