

研究论文

改变基底合成不同形貌碳纳米管宏观结构

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摘要: 采用化学气相沉积法, 选用不同基底和表面涂层合成了碳纳米管垂直阵列薄膜、管束和条带三种碳纳米管宏观结构, 并用扫描电镜(SEM)和透射电镜(TEM)进行了表征。结果表明: 在石英涂层上合成的定向碳纳米管薄膜厚度达毫米级; 在表面有Al₂O₃涂层的不锈钢基底上可合成碳纳米管垂直阵列薄膜和不同尺寸宏观管束结构; 在表面有SiO₂涂层的不同基底上实现了一种宏观条带的规模制备, 并在镍基底上定向生长出条带。结合实验结果探讨了在不同基底上碳纳米管宏观结构的形成机制。

关键词: 无机非金属材料 碳纳米管 化学气相沉积 基底

Synthesis of Carbon Nanotube Macroscopic Structures with Different Morphologies by Changing Substrates

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Abstract: Macroscopic carbon nanotube (CNT) arrays, bundles and ribbons were synthesized by chemical vapor deposition on different substrates with coating, and were characterized by scanning electron microscopy (SEM) and transmission electron microscopy (TEM) examinations. The results show that the well-aligned arrays were synthesized on the quartz glass and the length reaches millimeter range; CNTs macroscopic films or bundles with different diameter were prepared by self-organizing on the stainless steel with Al₂O₃ coating; Macroscopic CNT ribbons were synthesized on different substrates with SiO₂ coating, and aligned ribbons were prepared on nickel substrate. The formation mechanism of macroscopic structures was discussed.

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