

研究论文

裂解酞菁铁和乙烯制备取向碳纳米管阵列

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摘要 采用热化学气相沉积(TCVD)法裂解酞菁铁(FePc)和乙烯(C₂H₄)制备出高210 μm的取向碳纳米管阵列(ACNTA). 用扫描电子显微镜(SEM)、透射电子显微镜(TEM)、拉曼光谱和X射线光电子能谱(XPS)对制备的样品进行了表征, 系统研究了反应温度、反应时间、C₂H₄流量对ACNTA生长的影响. 结果表明, 样品具有高取向性且纯度高. 800 °C是裂解FePc和C₂H₄制备ACNTA的最优温度, 催化剂的活性可以保持较长时间(60 min), 通入C₂H₄促进了ACNTA的快速生长, 最适合流量为50 cm³/min.

关键词 [取向碳纳米管阵列](#) [酞菁铁](#) [热化学气相沉积法](#)

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Preparation of Aligned Carbon Nanotube Arrays by Pyrolysis of Iron(II) Phthalocyanine and Ethylene

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Abstract Aligned carbon nanotube arrays(ACNTA) with 210 μm in length were prepared by pyrolysis of iron(II) phthalocyanine(FePc)and ethylene(C₂H₄). The as-grown ACNTA, which were well-aligned and pure, were characterized by scanning electron microscopy(SEM), transmission electron microscopy(TEM), Raman spectrum and X-ray photoelectron spectroscopy(XPS). The influence of experimental conditions, such as temperature, growth time, and flow rate of C₂H₄ on the formation of ACNTA were systematically investigated. The results indicate that 800 °C was the most suitable temperature for the preparation of long ACNTA by pyrolysis of FePc and C₂H₄, the activity of catalyst could be kept for a rather long time(60 min), the addition of C₂H₄ significantly enhanced the growth speed of ACNTA and 50 cm³/min was found to be the optimal flow rate for the formation of ACNTA.

Key words [Aligned carbon nanotube array](#) [Iron\(II\) phthalocyanine](#) [Thermal chemical vapor deposition](#)

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