氫氧化鉀後處理對熱化學氣相沉積奈米碳管場發射特性之影響

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摘 要

本實驗利用氫氧化鉀(KOH)化學溶液對奈米碳管進行化學純化後處理，以研究其對於奈米碳管後處理的場發射特性之影響。本研究以熱化學氣相沉積(thermal chemical vapor deposition)法成長奈米碳管。甲烷(CH4)氣體是主要的碳原子來源，氬氣(Ar)則作為載氣使用，催化劑則是使用鎳金屬；甲烷被觸媒熱分解來獲得碳原子，並從而成長出奈米碳管。我們使用拉曼光譜(Raman spectroscopy)、電子顯微鏡(SEM)、穿透式電子顯微鏡(TEM)、能量散佈分析儀(EDS)分析經過化學溶液後處理的奈米碳管特性。從實驗數據得知，KOH化學溶液對於奈米碳管有純化的效果。從改變KOH化學溶液的後處理時間的結果得知，隨著化學溶液後處理時間的增大，經過蝕刻的奈米碳管本身結構也會遭受到嚴重破壞，且奈米碳管數目會逐漸變少。另外，從場發射的分析，典型的CNT場發射電流為0.44 mA/cm2，經過KOH化學溶液處理30分鐘的奈米碳管的場發射電流達到7.92 mA/cm2，因此，使用KOH化學溶液處理奈米碳管，場發射特性有顯著的增強效果。

關鍵詞 : 奈米碳管、場發射、熱化學氣相沉積

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