奈米碳管電漿後處理對場發射特性之影響

許博凱、李世鴻

E-mail: 9606948@mail.dyu.edu.tw

摘 要

本實驗利用熱化學氣相沉積法來成長奈米碳管(CNT)，主要的碳原子來源為甲烷(CH4)，並以Ar當載氣，將CH4帶入爐管中反應，利用觸媒熱分解效應將CH4分解成碳原子並成長出典型的CNT。之後利用CF4及Ar對典型的CNT進行電漿後處理。我們也用拉曼光譜、SEM、EDS、TEM來分析經過電漿處理後的CNT微結構。從實驗數據得知，電漿處理後的CNT頂端的被修改，而且非晶質碳也被移除。這些因素會導致場發射電流的增大。另外，從場發射的分析，經過CF4電漿處理2分鐘的場發射電流達到9.5 mA/cm 2，而Ar電漿處理2分鐘後場發射電流只有3 mA/cm 2。這個相當大的差異可以歸因於CF4電漿處理之後所發現的聚集現象，這聚集現象可以提供許多的場發射點。

關鍵詞 : 奈米碳管 ; 場發射 ; 熱化學氣相沉積

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