使用氮基氣體前處理催化劑金屬及其對熱化學氣相沉積奈米碳管場發社特性之效應 = Catalyst metal pre-treatments using ...

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摘 要

本研究中我們利用熱化學氣相沉積法成長奈米碳管，主要探討催化劑鎳膜金屬通入N2、NH3、N2O等氣體對催化劑鎳膜金屬前處理對奈米碳管成長及場發射特性的影響。研究的過程中，我們利用掃描式電子顯微鏡(scanning electron microscopy, SEM)觀察碳管的表面形態及管壁結構，使用拉曼頻譜(Raman spectroscopy)、能量散佈分析儀(energy dispersive spectrometer, EDS)來分析N2、NH3、N2O對催化劑鎳膜金屬前處理對奈米碳管表面型態與組成成份及結構上的改變，最後探討N2、NH3、N2O前處理對奈米碳管的成長與場發射特性的關係。從研究結果發現，使用N2O氣體流量200sccm時對催化劑鎳膜金屬處理後，所成長的奈米碳管場發射電流會變大。原因主要是因為N2O對催化劑鎳膜金屬前處理成長過程中分解出的氮原子和氧原子會與催化劑鎳金屬反應，會抑制非晶質碳的生成並使碳管表面的場發射點的數目增加，造成奈米碳管表面型態上的顯著改變，這型態上的改變對於場發射電流有增強的效果。

關鍵詞 : 奈米碳管;場發射;熱化學氣相沉積

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