

研究论文

## 碳纳米管结构对碳纳米管载Pt催化剂电催化性能的影响

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**摘要** 在制备单、双壁及不同管径的多壁碳纳米管(CNTs)的基础上, 用液相还原法把Pt沉积到单、双壁和管径不同的多壁CNTs上. 发现制得的CNTs载Pt(Pt/CNTs)催化剂对甲醇氧化的电催化活性随CNTs管径减小而增加. 这归结于管径小的CNTs的比表面积较大, 含氧基团多, 有利于提高Pt粒子分散度, 加上管径小的单壁CNTs具有更高的导电性, 这些因素都有利于提高Pt/CNTs催化剂对甲醇氧化的电催化活性.

**关键词** [碳纳米管](#) [铂](#) [催化剂](#) [甲醇氧化](#) [管径](#)

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## Effect of Structure of Carbon Nanotubes on Electrocatalytic Performance of Carbon Nanotubes Supported Pt Catalysts

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**Abstract** The effect of the tube diameter of the carbon nanotubes(CNTs) as the supporter of Pt catalyst on the electrocatalytic activity of the CNTs supported Pt(Pt/CNTs) catalysts was studied based on the preparation of CNTs with the single, double and multi walls. The Pt/CNTs catalysts were prepared using liquid phase reduction method. The XRD results demonstrate that the average sizes of the Pt particles in the Pt/CNTs catalysts with different tube diameters are almost the same(3.6 nm). However, the electrochemical results indicate that the electrocatalytic activity of the Pt/CNTs catalysts for the methanol oxidation increases with the decrease of the tube diameters of CNTs. The reason can be attributed to that CNTs with the small tube diameter possess large specific surface area and more oxygen-containing groups, which are favorable for the dispersion of the Pt particles in the Pt/CNTs catalysts. In addition, it has been reported in the literature that the resistance of CNTs with the single wall is smaller than that of CNTs with multi walls. Therefore, the above three factors lead to that the electrocatalytic activity of the Pt/CNTs catalysts with the small tube diameter of CNTs for the methanol oxidation is higher than that with the large tube diameter of CNTs.

**Key words** [Carbon nanotubes\(CNTs\)](#) [Pt](#) [Catalyst](#) [Methanol oxidation](#) [Tube diameter](#)

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