

多壁碳纳米管作为气相色谱固定相的性能研究

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**摘要** 将甲烷催化裂解法生产的经过纯化的多壁碳纳米管(PMWCNTs)、活性炭、石墨化碳黑(Carbopack B)分别填充成气相色谱填充柱,比较它们分离烷烃、芳香烃、卤代烃、醇、酮、醚、

酯类的性能。分别在PMWCNTs和Carbopack B上涂清5%(w/w)的Carbowax 20M,填充成气相色谱填充柱后,比较它们分离醇、酮、醚、酯、有机酸类的性能。结果表明,

PMWCNTs是一种性能优异的气相色谱固定相。与相同比表面积的Carbopack B石墨化碳黑相比较,

它有更强的保留能力,适合于分析沸点相对较低的化合物;具有更均匀的表面,

表现为极性化合物亦可得到对称的峰形;理论塔板数较小。此外,和Carbopack B一样,PMWCNTs涂清5%

(w/w) Carbowax 20M后可用来分离极性化合物,甚至是强极性的小分子有机酸。

**关键词** [气相色谱](#) [活性炭](#) [纳米相材料](#) [碳黑](#) [填充柱](#) [分离](#)

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## Study of Properties of Multi-Walled Carbon Nanotubes (MWCNTs) as Gas Chromatographic Column Packing Material

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**Abstract** The purified MWCNTs (PMWCNTs), prepared by catalytic decomposition of methane, activated carbon and graphitized carbon black (Carbopack B) were used as gas chromatographic column packing materials. Their characteristics of separation of aromatic hydrocarbons, alkanes, halogenated hydrocarbons, ketones, ethers, esters and alcohols were compared. PMWCNTs and Carbopack B modified with 5% (w/w) Carbowax 20M were also used as gas chromatographic column packing materials to separate ketones, ethers, esters, alcohols and organic acids for comparison of their separation properties. The results show that PMWCNTs are excellent packing materials. Comparing to Carbopack B with the same surface area, PMWCNTs has the following characteristics: having stronger retention ability, suitable for the separation of compounds with relatively low boiling points, showing symmetric peaks for polar compounds due to its more homogeneous surface, having lower theoretical plate number. Similar to Carbopack B, PMWCNTs modified with 5% (w/w) Carbowax 20M can be used to separate polar compounds, even lower organic acids.

**Key words** [GAS CHROMATOGRAPHY](#) [ACTIVE CARBON](#) [NANOPHASE MATERIALS](#) [CARBON BLACK](#) [PACKED COLUMN](#) [ISOLATION](#)

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