

## Analysis of Carbon Nano-Network Materials by Direct Laser Time of Flight Mass Spectrometry

CAI Yun<sup>1</sup>, WANG Jing-lan<sup>1</sup>, YING Wan-tao<sup>1</sup>, YANG He-yi<sup>1</sup>, LU Shang-yi<sup>1</sup>, QIAN Xiao-hong<sup>1</sup>,  
CHEN Zhen-ling<sup>2</sup>, QU Li<sup>2</sup>, ZHANG Jun<sup>2</sup>, ZHAO Yu-liang<sup>2</sup>, GAO Xing-fa<sup>2</sup>, CHAI Zhi-fang<sup>2</sup>

(1. Institute of Radiation Medicine Academy, Military Medical Sciences, 100850, China;

2. Institute of High Energy physics, Chinese Academy of Science, Beijing 100039, China)

**Abstract** The carbon nano-network material is synthesized by the arc discharge of the electrode, which is made of the graphite and metal oxide and placed in the argon atmosphere. The carbon nano-network materials, C<sub>60</sub>, C<sub>70</sub>, C<sub>76</sub>, C<sub>78</sub>, C<sub>84</sub> and C<sub>82</sub>@La are used as analyzed materials. A series of fragment mass peaks corresponding to the C<sub>2n</sub>-loss (n = 1, 2, 3, …) of fullerene and metallofullerene molecules are observed in positive mode. The intensities of the fragment ions are found to increase regularly with the increasing size of the carbon cage. Furthermore, intensities for [M-C<sub>2n</sub>H]<sup>+</sup> ions are found to be higher than those for [M-C<sub>2n</sub>]<sup>+</sup> in all samples. The results provide us with useful information about the cage structure and stability of carbon nano-network materials.

**Key words:** mass spectrometry; analysis of carbon nano-network materials; direct laser TOFMS; fullerene; metallofullerene

### 专利简讯

#### 质谱法筛选催化剂

【公开日】 2002 03 13   【公开号】 1340160   【主分类号】 G01N 31/10

【申请日】 2000 01 24   【申请号】 00802941.5   【分类号】 G01N 31/10; H01J 49/42

【申请人】 泰利斯技术股份公司   【地址】 瑞士苏黎世

【发明人】 P·陈; C·希德林   【国际申请】 PCT/B00/00062 2000 1 24

**【摘要】** 利用质谱分析催化产物,特别是催化周期中与催化剂键合的中间产物,来鉴定催化剂或者鉴定改进的催化剂的筛选方法。具体地说,本方法适用于筛选具有催化作用的有机金属化合物。另外,本方法适用于筛选聚合反应催化剂。本方法使用一种两段(或两步)质谱检测法,其中在第一阶段电离过程中形成的、并且与催化剂性能相关的离子被选择出来,而在第二阶段中利用串联质谱法鉴定与所选择的离子相关的催化剂。在具体实施方案中,由于催化剂(或其一部分)保持附着在产物上,致使催化剂本身暗含在产物分子质量(通常为中间产物)内,因此本发明的筛选方法避免了显式编码过程。

## Determination of Trace Sulfur Hexafluoride in Nitrogen Trifluoride Gas by Gas Chromatography-Mass Spectrometry

WEI Gui-huan, ZHANG Hong-bin, YUAN Xia

(The 718th Institute of CSIC, Hebei, Handan 056027, China)

**Abstract** The trace sulfur hexafluoride in high pure nitrogen trifluoride gas was determined by selective ion monitor (SIM) mode. The analysis is carried out on a poraPLOT Q capillary column ( $5 \mu\text{m} \times 0.32 \text{ mm} \times 30 \text{ m}$ ) and QP5000 GC/MS. The quantitative selected ion is  $m/z$  127. The interference to the determination of selected ion was studied. The linear range is from 2.0 to 100  $\mu\text{L/L}$  with relative coefficient of 0.9996. The minimum detection limit is 0.2  $\mu\text{L/L}$ . The average recovery is 92.70% ~ 97.04%. The intra-day and inter-day relative standard deviation ( $s_r$ ) of  $\text{SF}_6$  is less than 4.17% and 5.33%, respectively.

**Key words** mass spectrometry; determination of trace sulfur hexafluoride by gas chromatography-mass spectrometry; selective ion monitor (SIM); nitrogen trifluoride ( $\text{NF}_3$ )

### 专利简讯

#### 用于质谱原位检测的连续进样装置

【公开日】 2000.07.19   【公开号】 2388602   【主分类号】 G01N 35/10

【申请日】 1999.08.27   【申请号】 99242040.7   【分类号】 G01N 35/10

【申请人】 中国科学院兰州化学物理研究所   【发明人】 张兵; 郭耘

【地址】 730000 甘肃省兰州市城关区天水路 342 号

**【摘要】** 本实用新型公开了一种用于质谱原位检测的连续进样装置。由采样毛细管、三通转换接头、稳流阀、流量计、机械泵和精密泄露阀等组成。利用三通转换接头与机械泵配合形成一 W 型的等比例采样气路, 稳流阀、流量计和机械泵组成了可随时调整的采样调节装置, 简便易行。本实用新型适用于任何反应线路(包括带压操作)质谱检测的气体或可挥发性液体样品的采样, 可在任何反应现场灵活、方便地连接, 可方便地与色谱、红外等联机使用, 实现一机多用。