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# 高灵敏度纳喷雾正交飞行时间质谱法

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摘要 研制了纳喷雾离子化技术与正交飞行时间质谱的联用接口，在电场力的作用下 ，样品流速约为30nL/min,40nmol/L细胞色素c溶液的单张图谱样品消耗量为0. 02amol、检测限约为0.8～1.2zmol. 由于纳喷雾离子化技术的离子化机理与常规离 子化方法有所不同，由母液滴裂解成能被直接检测的液滴的步骤少，因此能增加检 测的灵敏度，特别适合于分析多糖类分子。通过分析SBE-β-CD获得了较满意的结 果。另外还分别对agiotensin I进行了源内CID实验和对细胞色素c的胰酶酶解图谱 进行分析，对所有酶解的多肽混合物离子作了归属。证明纳喷雾技术是一种高灵敏 度，且适合于分析复杂基质环境及微量样品的技术。

关键词 飞行时间质谱法 细胞色素 多肽

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## High Sensitivity Nanoelectrospray Ionization Orthogonal Injection Time-of-flight Mass Spectrometry

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**Abstract** A nanoelectrospray interface was set up for hyphenating with orthogonal injection time-of-flight mass spectrometer. Low detection limit (about 0.8 ～1.2 zmol) and low sample consumption (about 0.02 amol) per spectrum was obtained by injecting horse heart cytochrome c into the mass sepectrometer with a nanoelectrospray interface at a flow rate of 30 nL/min. As smaller droplet is formed in nanoelectrospray process, the desolvation efficiency and the ionization efficiency could be enhanced and thus may facilitate naalysis of oligosaccharides. A better signal was obtained in analyzing SBE-β-CD by the nanoelectrospray interface compared with a microspray interface. In addtion, in-source CID experiment of agiotensin I and trypsin enzymatic peptides map of cytochrome c were achieved by nanoelectrospray interface, respectively. The results showed that all but one ion in cytochrome c was achieved clearly in nanoelectrospray spectrum.

**Key words** TIME-OFF FLIGHT MASS SPECTROMETRY CYTOCHROME POLYPEPTIDE

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