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C60 derivatives as novel matrices for analysis of small molecules by MALDI-TOF MS

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Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) is a convenient method to detect protein, oligosaccharides, synthetic macromolecules, etc, due to its high speed, high throughput, high stability and so on. However, it couldn't analyze efficiently on small molecules (usually < 500 Da) because the matrix could generate strong matrix-related background noise in the low-mass region, which interferes with the analysis of the samples. Accordingly, we recommend the use of large molecule compounds as matrices, which obviate the conventional matrix-related background disturbances to small molecules. And the MALDI-TOF MS could be used in metabolomics researches. Fluorine derivatives of C60 were utilized as matrices for the analysis of low molecular weight compounds, the hydrophobic property of the side-chain can help the sample solution to converge to further improve the sensitivity. In this work, we used C60 derivative as a matrix for the analysis of low molecular weight compounds in MALDI-TOF MS. C60 derivatives were successfully utilized as matrices for the analysis of various small-molecule compounds, including amino acids, peptides, flavone, vitamin and so on. Fig. 2 shows the analysis of leucine by using CHCA as a matrix, compared with C60 derivative matrix. Because leucine cannot absorb laser energy, the matrix should be used to analyze leucine by MALDI-TOF MS. In addition, due to the hydrophobicity of the whole fluorine side chain, the matrix, is expected to further concentrate samples, improve the sensitivity and reduce the limit of detection.

Biography

Dr. Shaoxiang Xiong has completed his Ph.D from Wuhan University in 1996 and postdoctoral studies from Institute of Chemistry, Chinese Academy of Science in 1998. He is the director of Beijing Mass Spectrometer Center in Institute of Chemistry, Chinese Academy of Science. He has published more than 50 papers in reputed journals and serving as an editorial board member of repute.