

A Plasmonic Mass Spectrometry Approach for Detection of Small Nutrients and Toxins

Authors : Haiyang Su, Kun Qian

Abstract : We developed a novel plasmonic matrix assisted laser desorption/ionization mass spectrometry (MALDI MS) approach to detect small nutrients and toxin in complex biological emulsion samples. We used silver nanoshells (SiO₂@Ag) with optimized structures as matrices and achieved direct analysis of ~6 nL of human breast milk without any enrichment or separation. We performed identification and quantitation of small nutrients and toxins with limit-of-detection down to 0.4 pmol (for melamine) and reaction time shortened to minutes, superior to the conventional biochemical methods currently in use. Our approach contributed to the near-future application of MALDI MS in a broad field and personalized design of plasmonic materials for real case bio-analysis.

Keywords : plasmonic materials, laser desorption/ionization, mass spectrometry, small nutrients, toxins

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