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Quantitative analysis of free fatty acids in human serum using cdte nanoparticles loaded on zeolite surface

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Nanometer-sized cadmium telluride particles were used as an inorganic matrix for the laser desorption/ionization mass spectrometry of free fatty acids in human serum. By changing the excitation power and the amount of a hole scavenger, the peak of deprotonated fatty acids was investigated. It was understood that the ionization of fatty acids were due to the biexciton Auger recombination and electron ejection from CdTe. CdTe were then loaded on zeolite surface. The peak intensity enhancement of the deprotonated ion of fatty acid was observed. This phenomenon was explained by measuring the carrier lifetime for Auger recombination in CdTe. In addition, reproducibility of fatty acid ions was highly improved reflecting homogeneous distribution of CdTe on zeolite surface. CdTe loaded on a zeolite surface (HM20) was successfully applied to the quantitative analysis of Ste in human serum by isotope dilution using $^{13}\text{C}18\text{-Ste}$. The concentration of Ste in human serum samples was estimated to be 76.62 mg/kg with the standard deviation (SD) of 2.37mg/kg.

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Applications of ambient mass spectrometry in food safety, phytochemistry, hair forensics and organic monolayer characterization

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Ambient mass spectrometry allows sampling on your benchtop at atmospheric pressure and often without any sample preparation. A short overview of ambient MS is given including ionization mechanisms. Several applications of Direct Analysis in Real Time (DART), Desorption Electrospray Ionization (DESI), Laser Ablation Electrospray Ionization (LAESI) and direct spray Mass Spectrometry (MS) from the author's lab are presented. DART-MS is a versatile, easy to handle and fast technique allowing sometimes even quantitative measurements of alkaloids, terpenes and flavonoids. An example is the measurement of the neurotoxin anisatin in dry Japanese star anise fruits without any extraction or sample preparation, allowing in seconds an unambiguous distinction between morphologically similar Chinese and Japanese star anise. In combination with high-resolution MS or MS/MS, it can be used for screening, quality control of herbal drugs and organic monolayers, adulteration detection, metabolomics and forensics. It can also be hyphenated to HPLC or TLC. LAESI-MS in combination with Ion Mobility Spectrometry (IMS) can resolve ions with identical mass, opening up new avenues for rapid fingerprinting. Pros and cons of the various techniques are presented.

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