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Ambient mass spectrometry: New directions in pharmaceutical analysis

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Ambient mass spectrometry (AMS), that allows rapid chemical analysis of untreated samples in the ambient environment, represents novel directions in pharmaceutical analysis. Because AMS is performed by direct sampling/ionization of analytes from native samples, it allows high throughput for the analysis of compounds in matrices using solvent-based desorption methods such as desorption electrospray ionization (DESI) or plasma-based methods such as direct analysis in real time (DART). As one of the most widely studied ambient ionization methods, DESI uses fast-moving solvent droplets to extract analytes from surfaces and propel the resulting secondary microdroplets towards the mass analyzer. The development of AMS takes advantage of the knowledge and experience accumulated in mass spectrometry as well as other areas of chemistry, physics and engineering. Several applications of AMS in supporting pharmaceutical product development are presented: (1) direct analysis of samples in matrix with little to no sample pretreatments; (2) MS-imaging (drug mapping in biological samples and tablet formulation as well as diagnosis of tissues); (3) conformation study of proteins and oligonucleotides; and potentially (4) investigation of salt forms of drugs in tablet or capsule formation. Manipulation of the chemistry accompanying ambient ionization can be used to further optimize chemical analysis. Extensions of the methodology to pharmaceutical analysis (such as direct analysis of biotransformation reaction mixtures in biological matrixes and trace analysis of genotoxic impurities) by reactive DESI via *in-situ* chemical derivatization (viz. gas-phase ion/molecule reactions) on surface are also covered.

Biography

Lianming Wu obtained a PhD in Mass Spectrometry (MS) from Purdue University under the guidance of Professor R Graham Cooks and followed by Postdoc Research Fellow in MS-based proteomics at Pacific Northwest National Laboratory under the guidance of Dr. Richard D. Smith. He has published forty one peer-reviewed scientific papers and book chapters on the subject of mass spectrometry and gave a number of oral presentations in national/international conferences such as ACS National Meeting and PittCon. He is currently working in Global Spectroscopy, Analytical Sciences & Development, GlaxoSmithKline.

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