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New method to detect intact molecular ions directly by charge sensitive particle detector

Yu-Cen Sun, Szu-Wei Chou and Yi-Kun Lee
AcorMass Technologies Incorporation, Taiwan

We have developed a highly charge sensitive particle detector, which is used in the mass spectrometry for intact protein molecules. The mass range of mass spectrometer can be thus measured, via such detector, is almost unbound. The charge sensing particle detector senses the electric field variation of incoming ions and represents the event as one pulse signal. Whenever the ions approach the Faraday tray of the detector, they directly induce an image current which is integrated as a prompt voltage difference across a small capacitor. This fast step response is then shaped into a narrow pulse, whose peak height is proportional to the number of the coming charges. The non-linear shaping response decreases, as the event width increases and it reaches a constant maximum plateau, as the event width is less than 30 μ s. Therefore, the incoming ion cloud is better with a passage duration less than 30 μ s, so as to get the best detection sensitivity for about 62 e/mV. The tailing of event pulse after shaping is about 200 μ s, with a background noise for about 3 mVrms at sampling rate of 200 kHz. More technologic features of our charge sensitive particle detector are: (1) No high-vacuum is required, (2) Usual voltage supply, low power consumption and low noise level, (3) Relatively inert to ion mobility and bipolar charge measurement, and (4) High charge sensitivity and large charge dynamic range.

Biography

AcorMass Technologies Incorporation is a startup company from Taiwan, since 2010, which was established to develop unique mass spectrometer with wide mass range. First product (AMS-200 series: inTrap MALDI mass spectrometer) covers molecular mass range from 500 to 500kDa, aiming at applications which include Bio-Medicine, Biochemistry, Biotechnology, Pharmaceuticals, Polymers etc. Many systems have been tested at major research institutes and hospitals, producing breakthrough results. We expect formal introduction to the market from this year (2017).

conan.sun@acromass.com

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