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## Adjustable combinatory ionization “guns” for multiple tasks of analytical MS

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The resolution, accuracy and sensitivity of MS are above all governed by its ion source, which has activated a continuous innovation of new ion sources. However, there remain challenges to perform dynamic internal calibration, to couple MS with separation techniques, and to execute direct MS detection of complicated samples. To facilitate analytical MS, we have tried a combinatory use of miniaturized ionization techniques for a decade, with several “point-to” or gun-like ion-source devices designed and fabricated, e.g., nano-electrospray ionization, alternating/direct current discharge ionization, and laser head as well. These “guns” could be used individually or in combination, allowing performance of dynamic internal calibration for high accurate mass determination, with peak-height adjustable at any time during measuring. It is not need to stop the measurement in order to re-prepare a new set of peak-height-rational analytes or internal standards as usual. On a gold-coated photonic crystal surface, isotope-free internal standard ladders could be *in situ* superposed on an analyte for “Golden” internal calibrations. Mass-shift ionization was achieved in MALDI-TOF MS of small molecules in combined use of chemistry, which avoids the strong background in the low  $m/z$  range, but adopts the advantages of high mass resolution (several ppm) in the optimal range between 1000-2000  $m/z$  by the aid of phthalocyanine derivatives. With some modifications, the “guns” could directly desorb and ionize some trace target analytes in complex soils and living plants and insects, or interface-freely cooperate with UPLC and CE.

### Biography

Yi Chen received his PhD in 1990 from Institute of Chemistry, Chinese Academy of Sciences (CAS), is a Professor of Analytical Chemistry, chairing Analytical Chemistry Department at University of CAS, and leading a research group on chemical perturbation analysis of cells and trace biological substances in living things. He has published 240 co-authored papers and 3 books and owned 20 patents. He is serving as Associated Editors and Editorial/Advisory Board Members of 15 journals, an associate member in Division V, IUPAC, and vice presidents of 5 Chinese academic societies including Professional Committee of Analytical MS in Chinese Chemical Society.

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