

Developing high resolution IMS-IMS MS techniques

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When biomolecules are electrosprayed into the gas phase they rapidly adopt new conformations that are defined by many factors, including the solution and source conditions used for ion formation as well as the size and internal energy of the macromolecule. One method for probing macromolecular structures that are formed is to record the ions' mobilities through an inert buffer gas under the influence of a weak electric field. The recorded drift times are proportional to orientationally averaged collision cross sections and depend upon the ions' shapes. This talk describes the development of ion mobility techniques as a means of separating complex mixtures of biomolecules. In this approach we first separate mixtures of ions based on differences in initial conformations that emerge from solution. After the initial separation we select some ions and these are gently activated to induce structural changes. The new distribution of conformations is then separated again. This technique forms the basis for hyphenated IMS-IMS-MS and related techniques, and offers advantages of increased speed analysis as well as enhanced selectivity and sensitivity. The current state of the technology as well as current limitations will be discussed.