



Nico M. M. Nibbering

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Nico Nibbering, one of the European pioneers in gas-phase ion chemistry and mass spectrometry passed away on August 22nd 2014.

Nibbering was born in 1938 in Zaandam (The Netherlands). In 1956 he started to study chemistry at the University of Amsterdam, where he would remain until his retirement. His career evolved very rapidly (he was appointed to the permanent staff even before obtaining his degree), and cumulated in the creation of his “own” Institute of Mass Spectrometry. Following retirement he remained active in the field, with a guest professorship at the Vrije Universiteit Amsterdam.

Nibbering was educated as an organic chemist. Early on he became fascinated by the emerging field of organic mass spectrometry. Merging organic chemistry with mass spectrometry, he quickly became one of the leading figures in the field of gas-phase uni- and bimolecular ion–molecule reactions. He was able to synthesize stable isotopically labeled organic compounds that were used to resolve the intricate details of reaction mechanisms, which he later in his career often complemented by theoretical calculations on ion structures and energetics. Nibbering’s insights meant that what appeared to be exotic and often incomprehensible rearrangement reactions of highly reactive ions, actually became logical pathways following the rules of enthalpy and entropy. His skills in solving reaction mechanisms were rivaled by only a few, and he was consulted by many colleagues from all over the world. Nibbering was fascinated by the properties of ions and his excitement visibly grew as his interest went from positively charged even-electron ions, via radical cations, to negatively charged (radical) anions. As an illustration of this, in his laboratory the polarity switch on the ion cyclotron resonance (ICR) instrument, constructed in-house to study positive or negative ions, was termed “boring” and “interesting”, respectively. Extraordinary ions, distonic ions (that contain both a radical and an ionic site on different atoms of the same molecule), carbenes, ion-neutral complexes, and chemical species appearing to display hypervalency, (CH_5^+ , H_3O^-) truly fascinated him. Some of these species were first detected in his laboratory, and later studied further in depth by amongst other theoretical chemists and ion spectroscopists. He loved working in areas that merged chemistry and mass spectrometry, but also included physics. Illustratively, he was attracted to field-ionization kinetics because of the opportunity to study chemical unimolecular reactions on the picosecond timescale and implemented

lasers early on to induce fragmentation of ions in sector instruments. These experiments revealed new reaction channels occurring predominantly at shorter timescales following ion activation.

Nibbering and his group were also pioneering scientists in ICR mass spectrometry, building the first Fourier-transform (FT) ICR mass spectrometer in Europe, thereby developing various novel approaches particularly in the area of ion selection. His work on correlated harmonic excitation fields in FT-ICR mass spectrometry is among his most highly cited papers. FT-ICR mass spectrometry became the method of choice to study ion–molecule reactions, which opened up new avenues for Nibbering into inorganic carbonylmetalate chemistry and the determination of gas-phase basicity and acidity of various compounds.

Starting around 1964 and continuing for almost another 50 years, Nibbering played a major role in national and international mass spectrometry. During this period, he published more than 400 articles. He enthusiastically lectured all over the world. Nibbering was a passionate teacher who always made time to discuss issues with professors and students alike. As supervisor of a large number of young PhD students, he passed on his great enthusiasm for mass spectrometry, so much so that many of them still work in the field. In his home country, he played a pivotal role in putting mass spectrometry “on the map”, and was active in promoting the founding of the Dutch Society for Mass Spectrometry (NVMS). Nibbering served also as Chairman and President of the European Society for Mass Spectrometry and the International Mass Spectrometry Society (IMSS).

Nibbering’s many contributions to mass spectrometry were recognized in a number of ways. He was awarded the Thomson Medal of the International Mass Spectrometry Committee in 1991, the Joannes Marcus Marci Award in 1992, and he was a member of the Dutch Royal Academy of Sciences (KNAW). Nibbering was also on many editorial boards of mass spectrometry journals.

Just before his death he published a monograph on the work he loved most, namely *Highlights of 50 years of ionic reaction mechanistic studies* (see <http://dx.doi.org/10.1016/j.ijms.2014.02.002>). This work is a “must-read” for every chemist interested in both gas-phase uni- and bimolecular reaction mechanisms and in the life’s work of this much-missed scientist.

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