Obituary

Hisashi Matsuda (1924–2011)

Hisashi Matsuda, who died on 13 November 2011, was an outstanding mass spectrometrist in the field of instrument design, and was one of the pioneers who successfully straddled the boundary between mass spectrometry between physics and biology.

He received a BS in Physics from Osaka University, where he also obtained M.S. and Ph.D. degrees in Physics. In 1955, he was appointed as an Assistant Professor in the Faculty of Science, Osaka University. He was promoted to Associate Professor in 1959 and, in 1963, he was promoted to Professor in the Department of Liberal Arts, Osaka University.

After graduation, he improved the Bainbridge–Jordan type mass spectrograph at Osaka University (Fig. 1) and achieved a mass resolution of 60,000. He succeeded in accurately measuring the atomic mass of light atoms: from hydrogen to sulfur. During the period 1953–1956, he designed and constructed a large mass spectrograph (the Ogata–Matsuda type) (Fig. 2). A mass resolution 900,000 was achieved, a feat that was the highest resolution in the world at that time. He subsequently developed a large dispersion mass spectrometer ($r^{-1}$) (Fig. 3), and achieved a mass resolution of 1,200,000 which is still the world’s highest resolution instrument. He was the recipient of a Nishina Memorial Prize in 1969.

In 1968–1969, he served as a visiting professor at the University of Giessen, and established a method for calculating the ion trajectory in the fringing field of an electric or magnetic sector and designed ion optics for a mass spectrometer. He designed a series of ion optics, some of which were commercialized by the private sector. As a result of this commercial success, he became very well known among by researchers around the world. In 1974, he designed and constructed a complete second-order double-focusing mass spectrometer consisting of a cylindrical electrostatic sector analyzer, an electrostatic quadrupole lens and homogeneous magnet (CQH) with a magnet radius of 500 mm (Fig. 4) and he adapted mass spectrometry for use in studies of biologically relevant molecules. He was awarded the Toray Science and Technology Prize in 1982 for these achievements.

In the late 1980s, he designed and constructed a new type of mass spectrometer named GEMMY—an instrument that was designed for use in studies of biological species with high molecular masses (Fig. 5). Having a geometry of QQHQC, with a magnetic field radius of 1.25 m, the mass range of the instrument was 25,000 mass units at an accelerating potential of 10 kV, and was successfully used to analyze mercury clusters with mass units in excess of 200,000. GEMMY was developed in conjunction with JEOL and was the largest commercial mass spectrometer in the world, at the time of its development.

Professor Matsuda retired from Osaka University in 1987, but continued to have an interest in the design of new ion optical systems. Among his interests were a small double focusing mass spectrometer, and a spiral orbit time-of-flight mass spectrometer. In 1991, he was the recipient of the Thomson medal from the International Mass Spectrometry Society, in honor of his outstanding achievements in mass spectrometry. He also received the Order of the Rising Sun, Gold Rays with a Neck Ribbon in spring 2002.

He was not only an outstanding scientist but also an outstanding teacher. Throughout his life, he maintained a deep interest in the future of the science of mass spectrometry and also was a source of inspiration to future scientists who are involved in the field of mass spectrometry.

Professor Matsuda touched the lives of many scientist and will be missed. The field of mass spectrometry is much poorer now that Prof. Hisashi Matsuda is no longer with us.

Michisato Toyoda
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Fig. 1. Photograph of the Bainbridge–Jordan type mass spectrograph at Osaka University (Left: Prof. Koreichi Ogata, Right: Prof. Hisashi Matsuda).

Fig. 2. Photograph of the Ogata–Matsuda type large mass spectrograph.

Fig. 3. Photograph of the large dispersion mass spectrometer ($r^{-1}$).

Fig. 4. Photograph of the complete second-order double-focusing mass spectrometer (CQH).

Fig. 5. Photograph of the large double-focusing mass spectrometer (GEMMY).