ELSEVIER

International Journal of Mass Spectrometry and Ion Processes 157/158 (1996) 1–4

International Journal of Mass Spectrometry and Ion Processes

A historical note on an unrecognized early stage of the development of fast scanning ion cyclotron resonance spectrometers: the resotron

J.-F. Gal

Groupe FT-ICR, Laboratoire de Chimie Physique Organique, Université de Nice-Sophia Antipolis, 06108 Nice Cedex 2, France

Received 17 September 1995; accepted 26 February 1996

Abstract

An article describing a fast scan ion cyclotron resonance (ICR) mass spectrometer (P. Genequand, Z. Angew. Math. Phys., 22 (1971) 951–975) has practically never been cited in the literature dealing with ICR instrumentation. A description of this instrument is given, along with some historical details. Further developments in an evaporation rate monitor are described. This application is based also on the generation of image currents by the circular in-phase ion movement in the magnetic field. No radiofrequency ion excitation was used in this instrument, since the initial thermal velocity of neutral atoms was the only source of ions kinetic energy. The possible reasons for these papers not being cited are briefly discussed.

Keywords: Fast scanning ICR spectrometers; Historical development; Resotron

In 1971 a paper appeared entitled "The Resotron, a fast scan cyclotron mass spectrometer" [1]. Most ion cyclotron resonance (ICR) spectrometers users are probably aware of the names "Omegatron" [2] and "Syrotron" [3], but I have never seen a citation of that particular publication nor read "Resotron" in any ICR papers. Only very recently Marshall has cited the Resotron article as an application of ICR [4]. To the best of my knowledge [1], has never been cited in a single paper dealing with fast scan ICR [5] or Fourier transform ICR (FT-ICR) [6]. A brief history of the development of this apparatus is given in this article, with the aim to shed some light on a piece of work that had been ignored so far.

In 1962, a research program to build a residual gas analyzer was launched by J.-P. Borel, codirector of the Physics Laboratory of the École Polytechnique de l'Université de Lausanne (EPUL, École Polytechnique Fédérale de Lausanne, then EPFL, in 1969). The device was intended to have the same reduced outgassing characteristics as the low cathode temperature Omegatron used by L.A. Petermann at the Batelle–Geneva Research Center, but without the problems associated with the direct current collection of ions: the necessity to bring the ions to a precise geometric location (the collector) within the resonance cell to detect them. The electronic design took advantage of the experience gained at Borel's Laboratory in the detection of low level nuclear magnetic resonance and electron paramagnetic resonance signals.

The first design was a slow scan prototype, described in the 1968 thesis report of M. Anderegg [7]. Apparently, no paper was

PII S0168-1176(96)04396-0