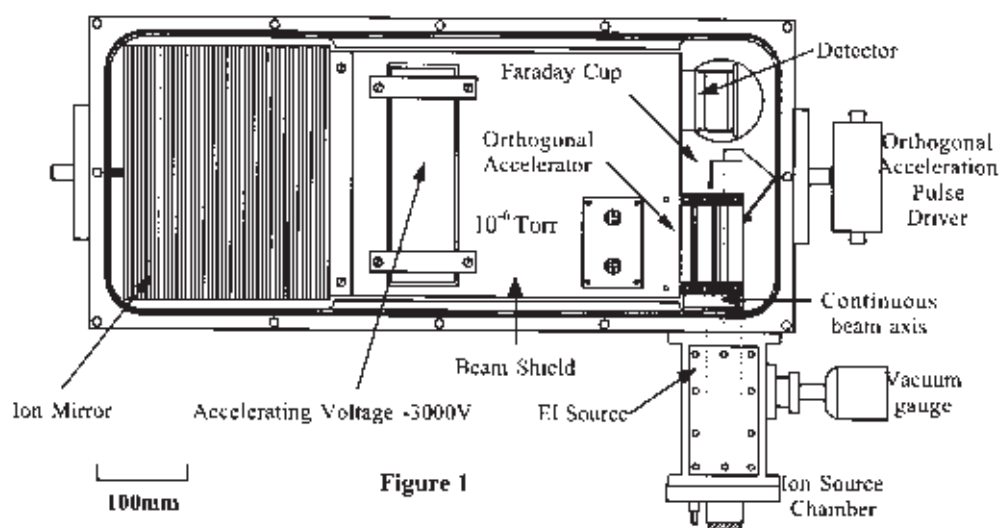


A COMPACT ORTHOGONAL ACCELERATION TIME-OF-FLIGHT MASS SPECTROMETER WITH AN OPTIMIZED ELECTRON IONIZATION SOURCE FOR FAST CHROMATOGRAPHY AND HIGH MASS ACCURACY.

Nageeb Sousou and Michael Guilhaus

School of Chemistry, The University of New South Wales, Sydney 2052 Australia

An Orthogonal Acceleration Time-of-Flight (reflecting geometry) Mass Spectrometer (oa-TOFMS) with an optimized Electron Ionization (EI) source has been constructed. The EI source was designed and optimized via the use of I-Opt1 and SimTOF2 computer programs. I-Opt facilitates the prediction of ion trajectories in static electric and magnetic fields. SimTOF predicts the resolution and peak shapes afforded by the instrument via the input of critical information, including ion abundance and kinetic parameters, instrument dimensions and grid effects. These programs have proven to be extremely successful in previous designs.³ The instrument utilizes an ETP electron multiplier detection system with a FASTFLIGHT digital signal averager providing an effective 2GHz-sampling rate, capable of measuring 0.5ns peak widths. The ion source generates a relatively intense ion beam (e.g. typical ion current of 5-10nA). A resolution of 1600 FWHM was measured for m/z 131, with a large detector pulse width ΔT_d (including electronic jitter) of approximately 7ns. A resolution of 4500-5000 would be achievable with a ΔT_d of 1.5ns. The instrument is being interfaced to a fast gas chromatograph (multi-capillary)/membrane introduction mass spectrometry (MIMS) system. The speed, sensitivity and resolution afforded by the instrument is well suited for the analysis of volatile organic compounds in process and environmental samples. The latest results for characterization of sensitivity and mass accuracy will be presented. The relative advantage of oa-TOF compared to scanning MS will be discussed.



1. I-Opt: Ion Optics Computer Program, © J.H.J. Dawson & M. Guilhaus 1988
 2. SimTOF: TOFMS Peak Shape Modeling Program, © M. Guilhaus & V. Mlynski 1993
 3. M. Guilhaus, D. Selby & V. Mlynski, Mass Spectrom. Rev., 19, 65, (2000).
- A copy of this presentation is available at
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