

Improved performance of a linear mode plasma desorption time-of-flight mass spectrometer with an electrostatic wire guide

S. A. Dissanayake¹, D. D. N. B. Daya¹, T. R. Ariyaratne¹ and M. S. B. Mohottalage²

¹*Department of Physics, University of Colombo, Colombo 3* ²*Industrial Technology Institute, 363, Bauddhaloka Mawatha, Colombo 7.*

In a plasma desorption time-of-flight mass spectrometer, secondary ion yield drops considerably when long flight paths are employed in order to increase the mass resolution. This has been a practical problem when the home-built mass spectrometer at the Department of Physics of the University of Colombo is used in the mass analysis of crude extracts of medicinal plants for the detection of active ingredients of respective plants. In order to overcome this problem, an electrostatic wire guide has been installed along the axis of the flight tube through which the secondary ions drift from the sample to the detector. A dc voltage of -300 V was found to be the optimum potential for the wire guide in order to produce maximum positive ion yield.

Several crude extracts of medicinal plants have been tried out as test samples with the wire guide at -300 V, and, typically, an increase of two orders of magnitude in the secondary ion yield of active ingredients of the crude extracts when compared to the ion yield without wire guide was recorded. This is an encouraging result as it helps produce clear mass spectra with intense peaks of active ingredients directly from their crude extracts even though the concentration of active ingredients in the crude extracts is very low when used without purification.