

Negative Ions for Fieldable Mass Spectrometry

W.B. WHITTEN, C.V. THOMPSON

Oak Ridge National Laboratory, Oak Ridge, TN

There are certain analytical situations for which negative ion mass spectrometry has advantages over the more commonly used positive ion methods. This is especially true for those analyte molecules with high electron affinity that are amenable to electron capture ionization. The purpose of this talk is to show some of the special results that have been obtained for field measurements of two perfluorinated molecules, perfluoro dimethylcyclohexane and uranium hexafluoride. The former has potential applications as an airborne chemical tracer in the environment, the latter finds use in uranium isotope enrichment. Despite the wide disparity in chemical reactivity of the two molecules, the negative ion mass spectra of both show a high discrimination against background interference and high stability of the molecular ion relative to the positive ion formed by electron impact.

This research has been supported by Tracer Detection Technology Corp. and by the U.S. DOE Office of Nonproliferation and International Security.