

In Situ Measurements by a New Gas Chromatograph-Mass Selective Detector (GC-MSD): A Progress Report

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In September 2002, we began work on the development and construction of an automated, three-channel gas chromatograph (GC) with a mass selective detector (MSD) and two electron capture detectors (ECDs), which will be used for in situ measurements at a Pacific CMDL station (Mauna Loa, Hawaii, or Trinidad Head, California). The instrument will make continuous measurements of a variety of chemical species with a wide range of lifetimes (e.g., Figure 1), including CFCs, HCFCs, HFCs, peroxyacetyl nitrate (PAN), methyl halides, nitrous oxide (N₂O), and sulfur hexafluoride (SF₆). The primary goal is to characterize the episodic long-range transport of polluted air from Asia. From this characterization, we hope to develop Asian emissions inventories and assess the implications for air quality in North America. We have begun development of several key components of this instrument, including a cryogenic trapping system for pre-concentrating samples for the MSD channel, a dynamic dilution system for calibration of PAN measurements on an ECD channel, and a packed column for measurement of N₂O and SF₆ by ECD. We present our progress on these aspects of the measurement system as well as a discussion of the science issues involved in deciding where to deploy the instrument.

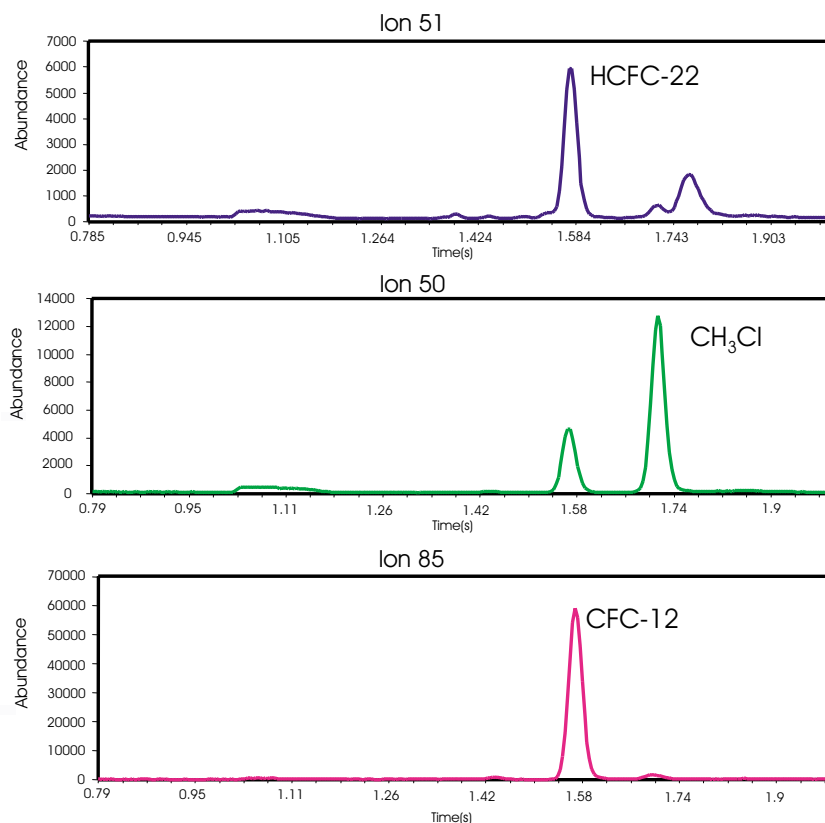


Figure 1. Chromatograms from the MSD channel of the GC-MSD instrument using a Porapak-Q trap for sample pre-concentration.