



## Contents

### Foreword

#### 103–104

#### Harsh environment mass spectrometry: New developments and applications

Stephen Taylor, Veronica M. Bierbaum

### Regular articles

#### 105–112

#### Utilization of *in situ* airborne MS-based instrumentation for the study of gaseous emissions at active volcanoes

Jorge Andres Diaz, David Pieri, C. Richard Arkin, Eric Gore, Timothy P. Griffin, Matthew Fladeland, Geoff Bland, Carlomagno Soto, Yetty Madrigal, Daniel Castillo, Edgar Rojas, Sergio Achí

A portable mass spectrometer, for the study and visualization of *in situ* ground and airborne volcanic plume measurements to monitor the awakening of Turrialba Volcano.

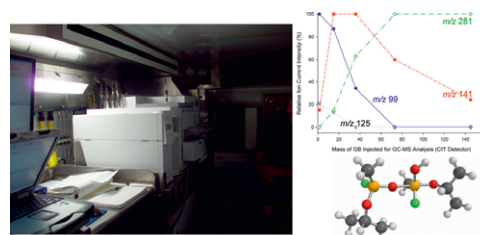


#### 113–118

#### Field-portable gas chromatography with transmission quadrupole and cylindrical ion trap mass spectrometric detection: Chromatographic retention index data and ion/molecule interactions for chemical warfare agent identification

Philip A. Smith, Carmela Jackson Lepage, Michael Lukacs, Nicholas Martin, Anton Shufutinsky, Paul B. Savage

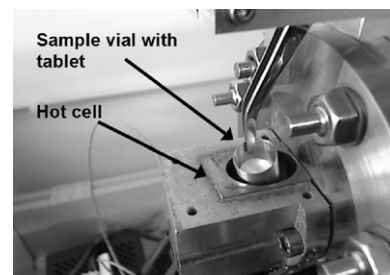
Two field-portable GC–MS systems were used for chemical warfare agent detection. With GC retention index information, electron ionization and a quadrupole mass filter identified analytes such as VX which normally require chemical ionization. Self-Cl in a cylindrical ion trap detector produced pseudomolecular ions such as the protonated dimer of sarin (GB) shown below, although concentration-dependent mass spectra were seen, as well as mass axis shifts due to space charge.



**119–123****Fast and direct recognition of the active ingredients in tablets using hot cell membrane inlet mass spectrometry**

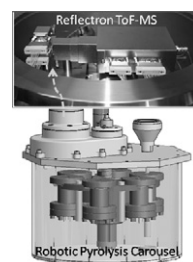
Frants R. Lauritsen, Katrine Nielsen

Hot cell MIMS makes it possible to develop field portable mass spectrometry for direct, on-site recognition of active ingredients in tablets commonly taken as an overdose.

**124–132****Development of an evolved gas-time-of-flight mass spectrometer for the Volatile Analysis by Pyrolysis of Regolith (VAPoR) instrument**

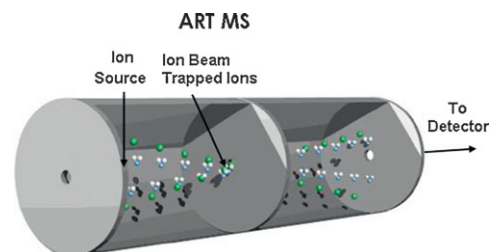
Stephanie A. Getty, Inge L. ten Kate, Steven H. Feng, William B. Brinckerhoff, Eric H. Cardiff, Vincent E. Holmes, Todd T. King, Mary J. Li, Erik Mumm, Paul R. Mahaffy, Daniel P. Glavin

VAPoR (Volatile Analysis by Pyrolysis of Regolith) combines pyrolysis and time-of-flight mass spectrometry to measure soil composition, volatiles, and trapped noble gases on the surface of airless bodies.

**133–137****Autoresonant Trap Mass Spectrometry (ART MS) for remote sensing applications**

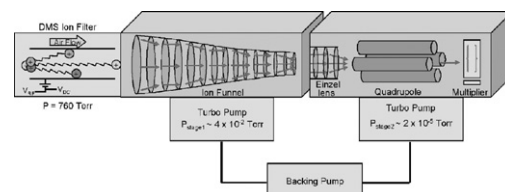
Gerardo A. Brucker, G. Jeffery Rathbone

A novel mass spectrometer is described that uses purely electrostatic fields to store ionized gases within a cylindrical ion trap.

**138–144****Differential mobility spectrometry/mass spectrometry: The design of a new mass spectrometer for real-time chemical analysis in the field**

Manuel J. Manard, Rusty Trainham, Stephan Weeks, Stephen L. Coy, Evgeny V. Krylov, Erkinjon G. Nazarov

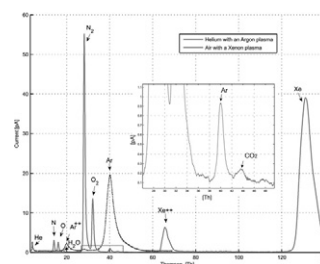
The design of a prototype, field-portable mass spectrometer (MS) is described. The MS has been designed with an atmospheric interface in order to couple the system to a commercially available differential mobility spectrometer. The differential mobility spectrometer provides selective injection of trace-level analytes of interest into the inlet of the MS for real-time chemical detection.



**145–148****Helium detection using a planar integrated micro-mass spectrometer**

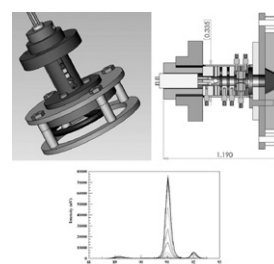
M. Reinhardt, G. Quiring, R.M. Ramírez Wong, H. Wehrs, J. Müller

We present the results of modifications done in the structure of our planar integrated micro-mass spectrometer. Thanks to these the mass scan region is shifted to lower masses, so that helium can be measured.

**149–152****Ion isolation and collision-induced dissociation in a 0.5 mm  $r_0$  cylindrical ion trap**

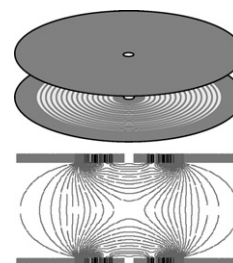
A.V. Jesseph, J.D. Fox, G.F. Verbeck IV

MS/MS ability of a sub-mm radius cylindrical ion trap for use in field-portable and harsh environments.

**153–158****Multipole expansion in quadrupolar devices comprised of planar electrode arrays**

Daniel E. Austin, Brett J. Hansen, Ying Peng, Zhiping Zhang

A method is presented to independently select and optimize higher-order multipoles in quadrupole ion traps made using two plates with lithographically-patterned electrode arrays.



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