Title (en)

Mass spectrometer

Title (de)

Massenspektrometer

Title (fr)

Spectromètre de masse

Publication

EP 2498273 A1 20120912 (EN)

Application

EP 11405227 A 20110307

Priority

EP 11405227 A 20110307

Abstract (en)

A mass spectrometer includes a chemical ionization source (22) comprising an ion molecule reaction region (33), a mass analyzer (12) and an interface (23) coupling the chemical ionization (22) source to the mass analyzer (12). The interface (23) comprises a first chamber (50) comprising a radio frequency focusing device (61), to be arranged adjacent to a gas conductance limiting exit aperture (38) of an ion molecule reaction region of the chemical ionization source (22) or adjacent to a gas conductance limiting aperture for feeding ambient air, the chamber (50) defining a collisional declustering region, at least one interface vacuum chamber (45) arranged downstream of the first chamber, the at least one interface vacuum chamber (45) being separated from the first chamber (50) by a further gas conductance limiting aperture (53). The pressure in the first chamber (50) is 0.01 mbar or more. This setup improves ion transmission into the interface stage (45) following the first chamber (50). Further, the radio frequency focusing device (61) more efficiently dissipates ion kinetic energy originating from expansion into the first chamber (50), improving achieved mass resolving power and mass accuracy in particular for applications where a chemical ionization source (22) is a component of an orthogonal time-of-flight mass spectrometer.

IPC 8 full level

H01J 49/10 (2006.01); **H01J 49/14** (2006.01)

CPC (source: EP)

H01J 49/0481 (2013.01); **H01J 49/063** (2013.01); **H01J 49/145** (2013.01)

Citation (applicant)

- US 7375317 B2 20080520 - ZHANG RENYI [US]
- US 6987264 B1 20060117 - WHITEHOUSE CRAIG M [US], et al
- US RE40632 E 20090203 - TANG KEQI [US], et al
- EP 07405077 A 20070308
- JUNNINEN, H., EHN, M., PETAJA, T., LUOSUJARVI, L., KOTIAHO, T., KOSTIAINEN, R., ROHNER, U., GONIN, M., FUHRER, K., KULMALA, M.: "A high-resolution mass spectrometer to measure atmospheric ion composition", ATMOS. MEAS. TECH., vol. 3, pages 1039 - 1053, XP055004075, DOI: doi:10.5194/amt-3-1039-2010
- J. P. KERCHER ET AL.: "Chlorine activation by N205: simultaneous, in situ detection of CIN02 and N205 by chemical ionization mass spectrometry", ATMOS. MEAS. TECH., vol. 2, 2009, pages 193
- P. VERES ET AL.: "Development of negative-ion proton-transfer chemical- ionization mass spectrometry (NI-PT-CIMS) for the measurement of gas-phase organic acids in the atmosphere", INT. J. MASS SPEC., vol. 274, 2008, pages 48, XP022715340, DOI: doi:10.1016/j.ijms.2008.04.032
- J. ZHENG ET AL.: "Atmospheric Pressure-Ion Drift Chemical Ionization Mass Spectrometry for Detection of Trace Gas Species", ANAL. CHEM., vol. 82, no. 17, 2010, pages 7302
- D. HANSON ET AL.: "Proton transfer reaction mass spectrometry at high drift tube pressure", INT. J. MASS SPECTROMETRY, vol. 223-224, 2003, pages 507, XP004397021, DOI: doi:10.1016/S1387-3806(02)00924-7
- W. LINDINGER ET AL.: "On-line monitoring of volatile organic compounds at pptv levels by means of Proton-Transfer-Reaction Mass Spectrometry (PTR-MS) Medical applications, food control and environmental research", INT. J. MASS SPECTROMETRY AND ION PROCESSES, vol. 173, 1998, pages 191, XP004111355, DOI: doi:10.1016/S0168-1176(97)00281-4
- J. D. CROUNSE ET AL.: "Measurement of gas-phase hydroperoxides by chemical ionization mass spectrometry", ANAL CHEM, vol. 78, no. 19, 2006, pages 6726
- A. DODONOV ET AL.: "New Technique for Decomposition of Selected Ions in Molecule Ion Reactor Coupled with Ortho-Time-of-flight Mass Spectrometry", RAPID. COMMUN. MASS SPECTROM, vol. 11, 1997, pages 1649, XP002101222, DOI: doi:10.1002/(SICI)1097-0231(19971015)11:15<1649::AID-RCM67>3.0.CO;2-T

Citation (search report)

- [XYI] US 7034292 B1 20060425 - WHITEHOUSE CRAIG M [US], et al
- [YD] H. JUNNINEN ET AL: "A high-resolution mass spectrometer to measure atmospheric ion composition", ATMOSPHERIC MEASUREMENT TECHNIQUES, vol. 3, 17 August 2010 (2010-08-17), pages 1039 - 1053, XP055004075, DOI: 10.5194/amt-3-1039-2010

Cited by

CN114361004A; CN109192648A; CN108695135A; GB2613439A; EP3629364A1; US11282692B2; WO2020065013A1

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

EP 2498273 A1 20120912

DOCDB simple family (application)

EP 11405227 A 20110307