MS 7: Massenspektrometrische Verfahren, neue Entwicklungen und Anwendungen

Zeit: Dienstag 16:30–17:30 Raum: 3E

MS 7.1 Di 16:30 3E

Fires over Greece in summer 2007 as observed from MERIS and SCIAMACHY — •Annette Ladstätter-Weissenmayer[1], Tilmann Dinter[1], Andreas Heckel[1], Wolfgang v. Hoynigen-Huene[1], Julian Meyer-Arnek[2], Andreas Richter[1], and John P. Burrows[1] — [1]Institute of Environmenetal Physics, Otto-Hahn Allee 1, 28359 Bremen — [2]German Aerospace Center (DLR), German Remote Sensing Data Center (DFD), Oberpfaffenhofen, 82234 Wessling

In summer 2007 during the time period of 24th to 27th of August 2007 intense fire events over a length of 160 km were observed over the Peloponnese. The focus of the study presented here is the analysis of remotely sensed data including satellite based observations by the MERIS (MEdium Resolution Imaging Spectrometer) and SCIAMACHY (The SCanning Imaging Absorption SpectroMeter for Atmospheric CHartographY) both on board of ENVISAT as well as forward trajectory analyses and chemical box model calculations. The AOT (Aerosol Optical Thickness) values from MERIS increase by a factor of 5 and range from 0.2 up to 1.0 comparing the beginning (unpolluted) and end (strongly polluted by biomass burning) of August 2007 following the trail of smoke. In addition, from SCIAMACHY measurements an increase of tropospheric nitrogen dioxide (NO2) from 4.0*1014 to 5.0*1015 molecules cm-2 and of glyoxal (CHOCHO) from 2.0* 1014 to 6.0*1015 molecules cm-2 was observed. Under this extreme biomass burning condition, this finally leads to photochemical ozone production.

MS 7.2 Di 16:45 3E

Rationale Selektion neuer MALDI-Matrizes — •Thorsten Jaskolla und Michael Karas — Institut für Pharmazeutische Chemie der Johann Wolfgang Goethe Universität Frankfurt am Main, Max-von-Laue-Str. 9, 60438 Frankfurt

Matrix-assisted laser desorption/ionization (MALDI) hat in den letzten Jahrzehnten als vielseitig anwendbare Technologie z.B. zum Zwecke der Protein- oder Peptidanalytik zunehmend an Bedeutung gewonnen. Dennoch fehlt bis heute ein geschlossenes mechanistisches Modell der Ionenbildungsprozesse und damit auch eine überzeugende Erklärung der notwendigen physikalisch-chemischen Eigenschaften einer erfolgreichen MALDI-Matrix. Die Bemühungen um eine Verbesserung beschränkten sich bisher überwiegend auf empirische Versuche zur Verbesserung der Präparationsprotokolle und Tests alternativer organischer Verbindungen. Dies hat nicht zu deutlich verbesserten Analytionenausbeuten geführt, so dass die heute genutzten Matrizes, wie α-Cyano-4-hydroxyzimtsäure (CHCA) oder 2,5-Dihydroxybenzoesäure (DHB), aus der MALDI-Frühzeit stammen. In einem systematischen Ansatz haben wir daher die funktionellen Gruppen der CHCA Matrix variiert und ihre Auswirkungen auf die Matrix-Eigenschaften untersucht. Auf dieser Basis ist es gelungen, eine neue Generation überlegener MALDI-Matrizes herzustellen. Vorgestellt werden neue überlegene Matrizes für Messungen im Positiv- und Negativ-Modus. Damit wird es auch möglich, genauere Aussagen über die zugrundeliegenden physikalisch-chemischen Prozesse zu machen.

MS 7.3 Di 17:00 3E

A Radio Frequency Mass Filter for SHIPTRAP — •Emma Haettner[1,2], Timo Dickel[1], Benjamin Fabian[1,2], Hans Geissel[1,2], Martin Petrick[1], Wolfgang Plass[1], and Christoph Scheidenberger[1,2] — [1]Justus-Liebig-Universität, Gießen — [2]GSI, Darmstadt

SHIPTRAP is an experiment at GSI for highly accurate mass measurements of fusion-evaporation products. Exotic nuclei produced in fusion reactions are separated from the primary beam in the velocity filter SHIP, stopped in a gas cell and bunched and transferred to a double Penning trap system.

Contaminant ions created in the gas-filled stopping cell can significantly reduce the performance of SHIPTRAP. In order to remove the contaminant ions from the nuclei of interest and thus increase selectivity and efficiency of the experiment, a radio-frequency quadrupole (RFQ) mass filter is being developed. In a matched combination with an RFQ cooler and an RFQ buncher, the mass filter will replace the existing SHIPTRAP buncher. Design parameters such as dimensions, voltages and vacuum conditions were chosen with help of simulations. Simulations and first measurements of the RFQ mass filter characteristics such as transmission and resolution will be presented.

MS 7.4 Di 17:15 3E

Design and Setup of a Time-of-Flight Isobar Separator and Mass Spectrometer for Exotic Nuclei — •Timo Dickel[1], Wolfgang Plass[1], Ulrich Czok[1], Hans Geissel[2], Martin Petrick[1], Katrin Reinheimer[1], Christoph Scheidenberger[2], and Mikhail I. Yavor[3] — [1]II. Physikalisches Institut, Justus-Liebig-Universität Gießen, 35392 Gießen — [2]Gesellschaft für Schwerionenforschung, 64291 Darmstadt — [3]Institute of Analytical Instrument Making, Russian Academy of Sciences, 190103 St. Petersburg

Mass measurements of nuclei far-off stability deliver important input in astrophysics (nucleosynthesis pathways) and nuclear physics. The duration of measurements of exotic nuclei is limited by their lifetime, and a prerequisite for a successful measurement is the ability to separate the nuclei of interest from isobaric contamination, which is usually produced with much higher rates than the nuclide of interest.

The present MR-TOF-MS is an ideal tool to solve these problems at low-energy radioactive ion beam facilities. It allows isobaric separation and measurement of nuclides with half-lives > 1 ms at a resolving power $>= 10^5$ and up to 10^7 ions/s. A setup for online measurements has been designed and is currently under construction. A dedicated cooler and buncher RF-trap assembly has been built as front-end for the MR-TOF-MS and successfully tested offline. First online experiments are planned for 2008.