

213 - A MULTI-VENDOR APPLICABLE TARGET SYSTEM FOR (MA)LDI INSTRUMENTS WITH DISTINCT PERFORMANCE CHARACTERISTICS FOR THE ANALYSIS OF SMALL ORGANIC MOLECULES RELATED TO C CHONDRITES

Edita Rados (1) - Ernst Pittenauer (1) - Johannes Frank (2) - Kurt Varmuza (3) - Günter Allmaier (1)

TU Wien, TU Wien/Institute of Chemical Technologies and Analytics, Vienna (1) - TU Wien, TU Wien/ Joint Workshop of the Faculty of Technical Chemistry, Vienna (2) - TU Wien, TU Wien/Institute of Statistics and Mathematical Methods in Economics, Vienna (3)

Keywords: small organic molecules, LDI, target adapter, gold target

Introduction:

A serious comparison of one and the same sample preparation on different LDI-MS instruments is usually not possible because each device requires the use of its own, specific target. Therefore, we developed a target system, which enables the use of only one target for different devices. The work was focused on the analysis of small organic molecules selected due to their different desorption/ionization behavior and their potential presence in carbonaceous chondrites.

Methods:

The selected organic molecules (e.g. tryptophan, 2-deoxy-D-ribose and triphenylene) were prepared and spotted onto the target plate (stainless steel or gold) and analysed on three devices with different performance characteristics, namely an Axima TOF2 (LinTOF/curved field RTOF), an ultrafleXtreme (LinTOF/dual stage RTOF) and a Synapt G2 (Qq/dual stage RTOF). The samples were also analysed on the TOF-SIMS 5 mass spectrometer equipped with gridless RTOF.

Results:

The developed target system consisting of modified Bruker target adapter, a standard SS Waters target plate and an Au target plate allowed comparison of data acquired on four MS instruments with different performance characteristics (e.g. different lasers, different laser repetition rates, different ion source vacuum regimes). The data were obtained for all analytes from plain SS and Au target. In positive-ion mode, we were able to detect different types of molecular ions (M^+ , radical cations, $[M+H]^+$, $[M+Na]^+$, and $[M+2Na-H]^+$ ions) depending on the type of analyte. All sample molecules showed similar desorption/ionization behavior on all instruments in the positive-ion mode independently of the target applied. A deprotonated molecule of tryptophan was also detectable on all instruments with the use of SS and Au target. The use of the Synapt G2 instrument allowed accurate mass determination (± 4 ppm) at a resolution of up to RFWHM 20.000 for all types of molecular ion. Additionally, low- and high-energy CID-spectra were acquired for tryptophan.

Conclusions:

We showed that an in-depth comparison of the data obtained with devices from different vendors with distinct performance characteristics is possible when the presented target system is being used. The possibility to obtain accurate masses can be useful in identifying unknown compounds in C chondrite meteorite samples.

Novel Aspect:

The developed target system allows the use of only one target on multiple LDI/MALDI-devices. Small organic molecules can be measured with LDI and accurate mass can be obtained.