NATIONAL INSTITUTE OF CHEMISTRY

MALDI-TOF/TOF

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D07 Odsek za polimerno kemijo in tehnologijo

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MALDI-TOF(/TOF) mass spectrometer

Matrix Assisted Laser Desorption / Ionization

Time-Of-Flight

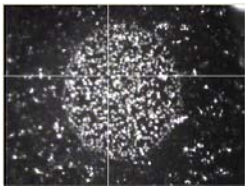
Bruker UltrafleXtreme MALDI-TOF mass spectrometer

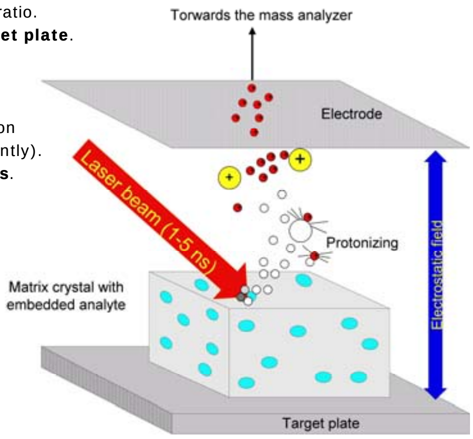
How does **MALDI** work?

Required items: - a **sample** to be analyzed
- a **matrix** substance
- a **laser**

MALDI preparation / MS analysis:

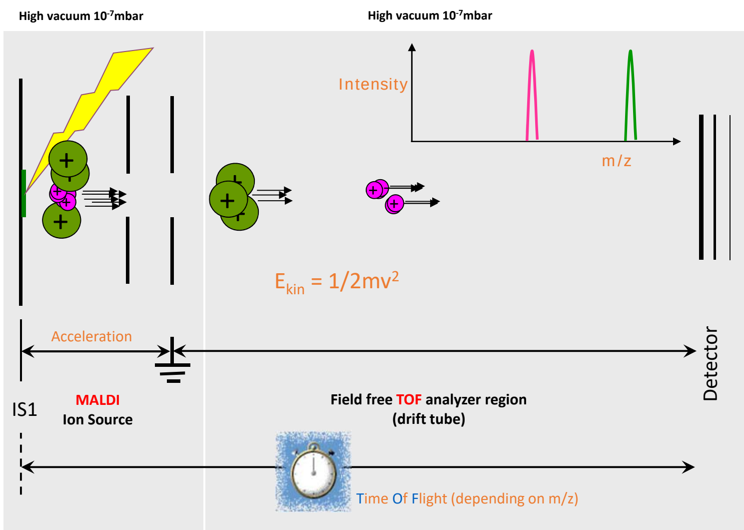
1.) **Mix sample and matrix** solutions in suitable ratio.
2.) Put a sub µl aliquot of this mixture on the **target plate**.
3.) Let the mixture **co-crystallize**.
4.) Insert the target plate in the MALDI mass spec (running under **high vacuum**).
5.) **Shoot with the laser** on the MALDI preparation to **generate ions** (**singly charged** predominantly).
6.) **Collect**, **analyze** and **detect** the resulting **ions**.



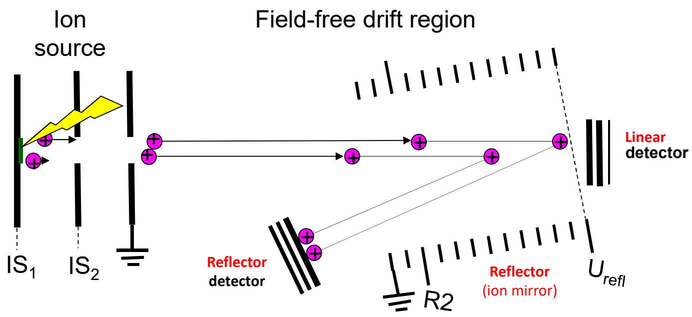


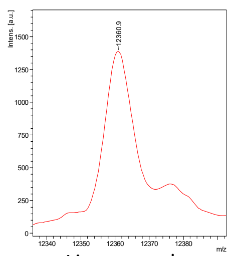
Positive ionization mode: $[M+H]^+$; $[M+Na]^+$; $[M+K]^+$; $[M+Cu]^+$; $[M+Ag]^+$
Negative ionization mode: $[M-H]^-$

MALDI-TOF: Linear mode

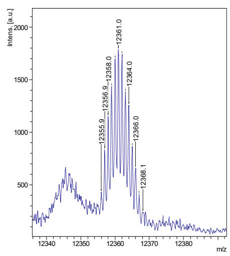


MALDI-TOF: Reflector mode



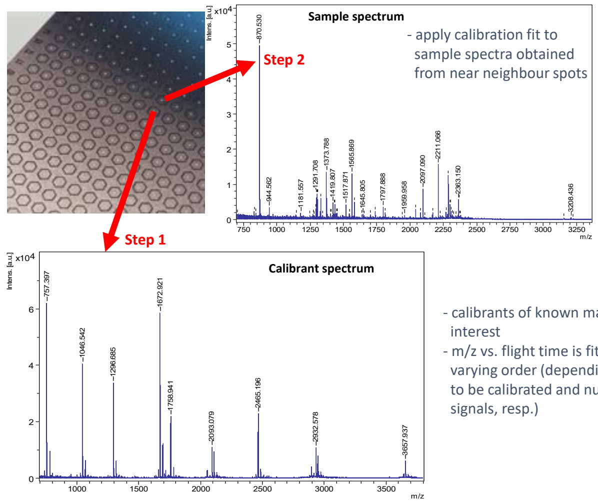


Linear mode



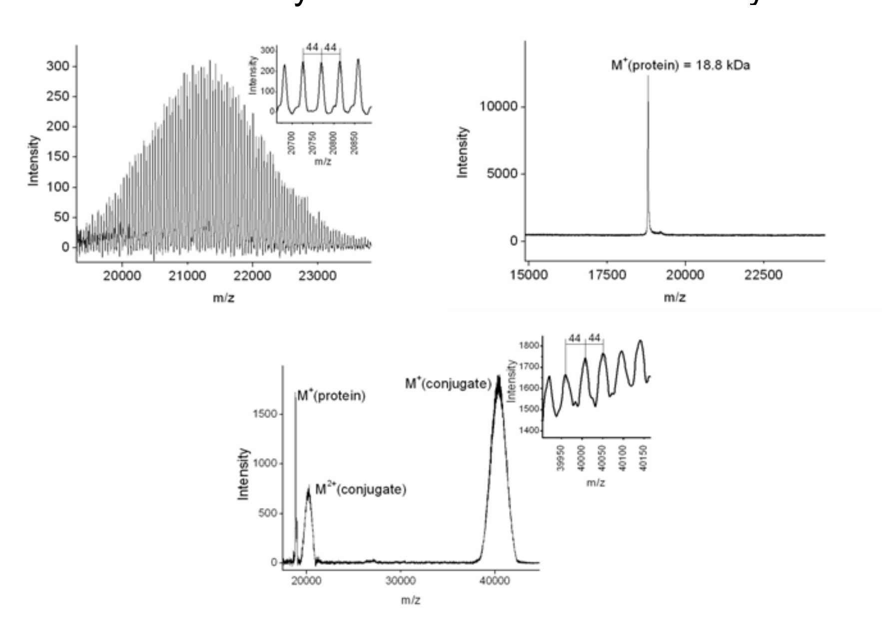
Reflector mode

MALDI-TOF: External calibration



- calibrants of known mass cover mass range of interest
- m/z vs. flight time is fitted using a polynom of varying order (depending on size of mass range to be calibrated and number of available calibrant signals, resp.)

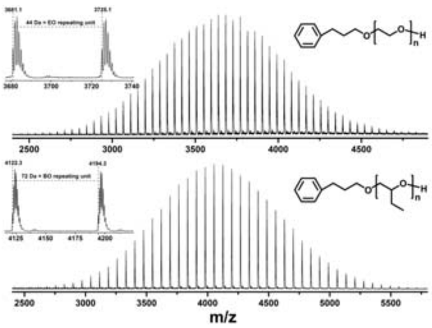
MALDI-TOF: Polymer Science vs. Biochemistry



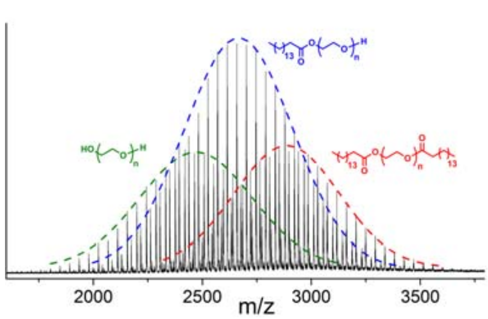
Analytical Chemistry **2012**, *84*, 7374

MALDI-TOF: Polymer Science

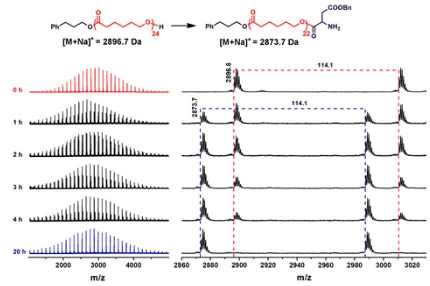
Different polymers



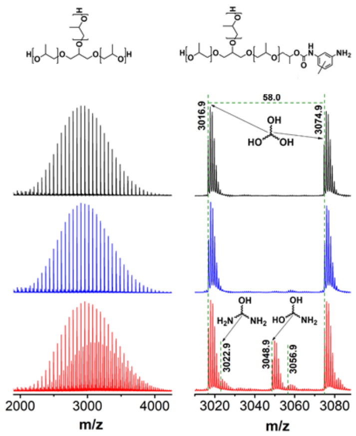
Different end-groups



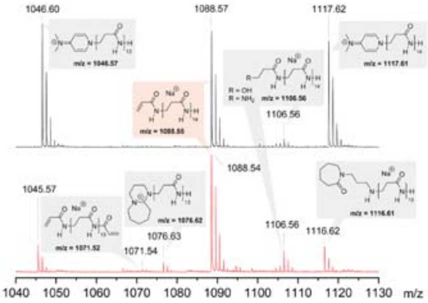
Initiation step in the block copolymer synthesis



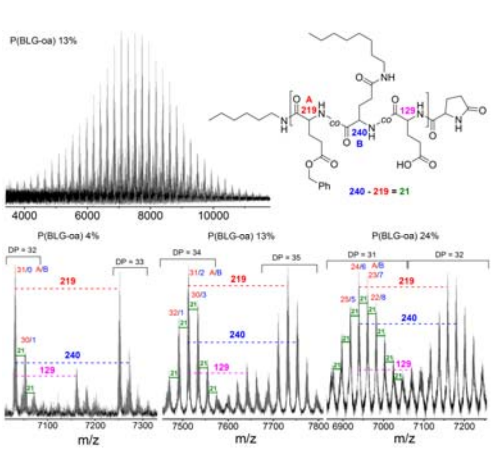
Chemical recycling of Polyurethane foams

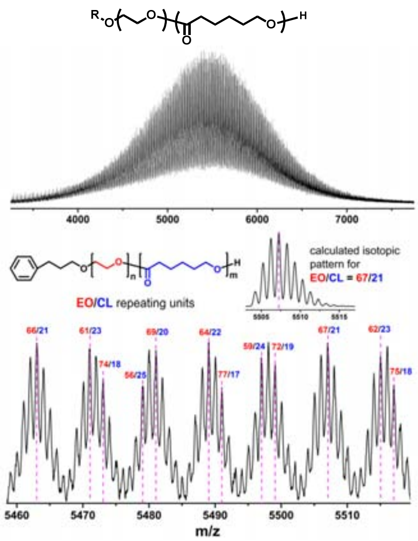


Mechanism of aza-michale polymerization of acrylamide (Slugovc, TU Graz)

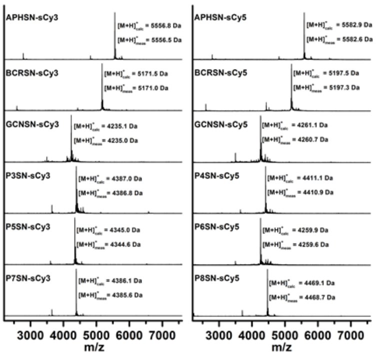


MALDI-TOF: Copolymers

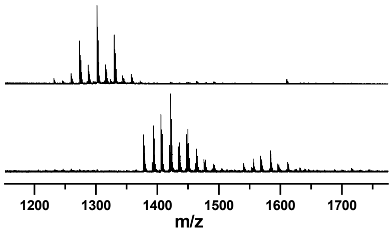




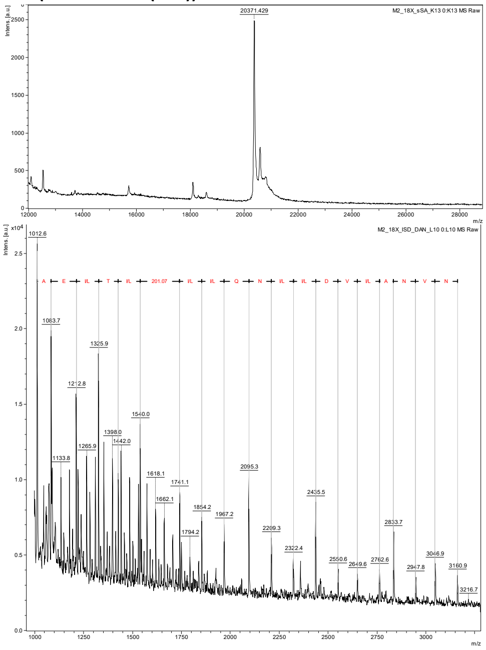
Fluorescent labelling of recombinant proteins (Jana Aupič (D12))



Determination of sphingolipid composition in plant extracts (Katja Pirc (D11))



ISD - Top-down sequencing of proteins (Ana Crnković (D11))



Thank you for your attention!

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