

Peptide sequencing using gold nanoparticles in Surface-Assisted Laser Desorption/Ionization “in-source decay” mass spectrometry

Surface-assisted laser desorption/ionization MS

Nanostructured substrates

- Nanoparticles
- Sputtered metal nanoclusters
- Solid nanosubstrates (porous silicon, nanopillar arrays)
- Polymeric nanowires
- ...

Mass spectrometer

LASER

Analytes

“Softness” ranking using thermometer ions

Cc1ccc(cc1)[N+]1=CC=CC=C1 $\xrightarrow{\text{Energy}}$ C1=CC=CC=C1N + Cc1ccc(cc1)[CH2+]

p-methylbenzylpyridinium ion
 $m/z = 184.1$
PARENT ION

pyridine
 Neutral loss
 \rightarrow not detected

p-methylbenzyl ion
 $m/z = 105.1$
FRAGMENT ION

Hard assisting materials
(i.e. induce a high degree of fragmentation)

Soft assisting materials
(i.e. induce a low degree of fragmentation)

Peptide sequencing using “in-source decay”

N-terminal fragments

C-terminal fragments

$x_3, y_3, z_3, x_2, y_2, z_2, x_1, y_1, z_1$

$a_1, b_1, c_1, a_2, b_2, c_2, a_3, b_3, c_3$

R_1, R_2, R_3, R_4