Neutral beams of large oligopeptides

J. Schaetti[a], P. Rieser[b], U. Sezer[b], G. Richter[b], P. Geyer[b], G. G. Rondinae[c], D. Häussinger[a], M. Mayor[a], A. Shayeghi[b], V. Köhler[a] and M. Arndt[b]

[a] University of Basel, Department of Chemistry, Basel 4056, Switzerland,
[b] University of Vienna, Faculty of Physics, Boltzmanngasse 5, Vienna 1090, Austria
[c] Eduard-Zintl-Institut für Anorganische und Physikalische Chemie, Technische Universität Darmstadt, 64287, Darmstadt, Germany
jonas.schaetti@unibas.ch

Neutral molecular beams are a requirement for quantum interference experiments and enable new methods in molecular gas phase metrology[1]. The generation and detection of neutral biomolecular beams, however, is still a major challenge. We have already shown that neutral beams can be generated by thermal evaporation[2] of modified tripeptides, which were then postionized for detection. Alternatively, electrosprayed species were successfully neutralized by cleavage of photoactive tags in high vacuum.[3]. Both methods are currently limited to short peptides. Another promising approach comprises the laser desorption of analyte material. Here we show, that derivatized tryptophan-rich polypeptides of up to 20 kDa can be efficiently laser desorbed and postionized. Their VUV-postionization exceeds current mass limitations by one order of magnitude.

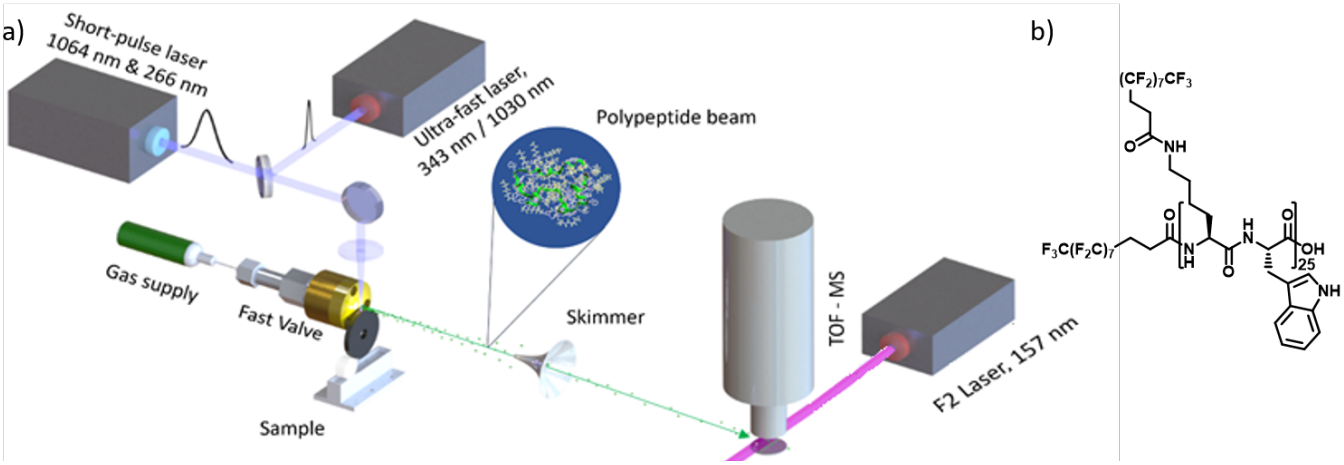

Fig1: a) Molecular beam machine developed in Vienna (group of Prof. M. Arndt). Fast or ultra-fast laser pulses can be used to desorb the analyte molecules from a powder coated rotating carbon wheel. The desorbed peptides are entrained by an adiabatically expanding noble gas jet. The molecular beam is ionized by a VUV-laser pulse and detected by a time-of-flight mass spectrometer. b) Tryptophan rich analyte molecule (20 kDa).

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