MO 29 Poster: Biomolecules

Zeit: Dienstag 16:30–18:30 Raum: Labsaal

MO 29.1 Di 16:30 Labsaal

Site selectivity in dissociative free-electron attachment to gas phase nucleobases — •Sylwia Ptasinska[1], Stephan Denifl[1], Fabio Zappa[1,2], Verena Grill[1], Paul Scheier[1], and Tilmann D. Märk[1] — [1]Institut für Ionenphysik, Leopold-Franzens Universität Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria — [2]UNESA, Rio de Janeiro, Brasil

The interaction of low energy electrons with DNA has been demonstrated to be an important mechanism in the production of both single and double strand breaks, even at sub-ionization energies [1]. Furthermore, the yield of such DNA damage shows a resonant behaviour with energy which is an indication of transient negative ion formation. In this contribution we will show the results of a series of gas phase experiments concerning free-electron attachment to the nucleobases thymine and uracil and partially deuterated or methylated derivatives. By careful analysis of the experimental data, we are able to assign each of the resonances of the abundant fragment anions (M-H)- and H- observed to the cleavage of an H atom from a specific site in these molecules.

This work was supported by FWF (Wien), the EU commission (Brussels, through the EPIC network and the COST Action P9). F.Z gratefully acknowledges a post-doc grant from the Brazilian agency CNPq.

[1] M. A. Huels, B. Boudaiffa, P. Cloutier, D. Hunting, L. Sanche, J. Am. Chem. Soc. 125(2003) 4467;

MO 29.2 Di 16:30 Labsaal

Stability of uracil and thymine cations — •Manuel Beikircher[1], Sylwia Ptasinska[1], Stefan Feil[1], Manuel Winkler[1], Arntraud Bacher[1], Werner Schustereder[2], Stephan Denifl[1], Olof Echt[3], Tilmann D. Märk[1], and Paul Scheier[1] — [1]Institut für Ionenphysik,Universität Innsbruck, Technikerstrasse 25, 6020 Innsbruck, Austria — [2]Max-Planck-Institut für Plasmaphysik, D-85748 Garching, Germany — [3]Department of Physics, University of New Hampshire, Durham, USA

Attachment of free electrons to uracil and thymine leads exclusively to the formation of fragment anions and the most abundant product are (U-H)- and (T-H)-, respectively [1]. However, in the positive mass spectrum of these molecules no H-loss is observed. This is in contrast to electron impact ionization of hydrocarbons where H-loss is an important process. In the present study H-loss from excited uracil cations has been discovered and the resulting ion (U-H)+ is observed to decay quickly into more stable products upon ring dissociation. The measurements are performed utilizing a modified VG-ZAB mass spectrometer in reversed geometry. The uracil and thymine molecules are ionized by electron impact at 74 eV. The ions are then accelerated at different acceleration voltages, from 1 to 10 kV, resulting in different flight times to the detector. By decoupling the two sector fields single decay processes are studied in two different windows and even the sequential decay of metastable uracil can unambiguously be identified.

[1] S. Denifl, S. Ptasinska, M. Probst, J. Hrusak, P. Scheier and T.D. Märk, J. Phys. Chem. A 108 (2004) 6562-6569