

# Scientific Report

guest:

Ilko Bald

Freie Universität Berlin

Institut für Chemie

Physikalische und Theoretische Chemie

Takustraße 3

D-14195 Berlin, Germany

ibald@zedat.fu-berlin.de

host:

Prof. Paul Scheier

Universität Innsbruck

Institut für Ionenphysik

Technikerstraße 25

A-6020 Innsbruck, Austria

paul.scheier@uibk.ac.at

dates of visit: 3rd July 2005 - 15th July 2005

The aim of the visit was a more detailed exploration of the negative ion states of sugar molecules. Due to delivery problems it was not possible to study isotope labeled D-Ribose as stated in the application. Instead we investigated D-Fructose (F) by means of dissociative electron attachment spectroscopy in the gas phase. D-Fructose is a sugar that can be found in fruits and possesses a six membered heterocyclic ring with five hydroxy groups.

We found that D-Fructose dissociates into various fragment ions after attachment of electrons near zero eV. An effective reaction channel is the loss of neutral water molecules leading to the formation of  $[F-H_2O]^-$  and  $[F-2H_2O]^-$ . Clear assignment of most fragments is ambiguous but at least five fragment anions are due to cleavage of the ring system. This result is important for the discussion of the generation of single strand breaks in DNA by electrons in the subexcitation regime ( $< 3$  eV). The zero eV resonances were observed earlier with the sugar molecules 2-Deoxy-D-Ribose and D-Ribose and are probably a general property of sugar molecules due to the large number of hydroxy groups.

Such low energy resonances were not found in previous experiments with Tetrahydrofuran and Furan (heterocyclic rings without hydroxy groups) performed in Berlin as well as in Innsbruck. Only core excited resonances occur in these molecules. A joint publication about D-Fructose, THF and Furan will follow and future collaborations are very likely.