

Scientific Report after completing the Short Term Mission

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The scientific mission has been carried out from the 3rd to the 7th of March 2008 at Prof. Illenberger's group (at the Institute für Chemie-Physikalische und Theoretische Chemie Berlin, Germany). The objective of this collaborative work has been to investigate the mechanism of fragmentation of methylcytosine induced by low energy (< 10 eV) electrons impact in the gas phase. The experiments have been performed with the Berlin's gas phase crossed electron-molecule beams apparatus.

The main difficulty (as well as the most time consuming) of such an experiment consist, in the first step, of finding the appropriate temperature required for the heating of the substance since methylcytosine is commercially available as a solid (powder). This temperature must be sufficiently low to minimize the decomposition of the product and on the other hands, high enough for getting sufficient signal to be measured. This optimized working temperature is experimentally estimated here by a gradual increase of the temperature, while monitoring the signal of the dehydrogenated parent ion at 1 eV electron energy. Indeed, for analogous products (e.g., thymidine) and also various biological interest molecules, dehydrogenated parent ion can be observed at 1 eV electron energy. The figure exhibits below represents a preliminary measurement of the electron energy dependence of the dehydrogenated parent ion.

Unfortunately, technical problems inherent to the experimental apparatus, i.e., break of the filament needed to produce electron have delayed the accomplishment of the full mission. However, further steps of this investigation (i.e., the seek of other formed fragment ions, reproducibility of measurements) are currently undertaken by the host group.

