SECONDARY PARTICLES EMISSION INDUCED BY COLLISION ON GAS PHASE AND SURFACE DEPOSITED DNA-RNA BASES

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Damages induced by ionizing radiation can directly be linked to alteration of the DNA molecule. In this work, we have investigated the very first stage of the interaction (collision) between ions and elementary constituents of DNA and RNA.

For bases in gas phase, fragmentation and ionization have been study by multicorrelation time of flight technique (fig 1) in a collisionnal energy domain corresponding to the Bragg peak formation in biological medium (for proton around 100keV). The knowledge of the pattern of fragmentation of a DNA part is important since the secondary molecules formed after irradiation will interact chemically with neighbouring constituents in the case of DNA. We have also performed some first scattering experiments of 4keV Ar ions on a gold sample, a part of which was covered with Uracil. The idea was to investigate the role of middle energy ion irradiation on a deposited base. The scattered and recoil particles are analyzed by Time Of Flight. The spectra shown below (fig 2) reveal the role of the pollution due to the residual gas in the experimental chamber (order of 10^{-10} torr), especially evident for the pure gold part of the sample (thin continuous line). In order to reduce the pollution we cleant it with a gentle heating to perform valuable data acquisition. We have performed analysis of the residual gas while heating the sample to determine the range of temperature which will not destroy the Uracil layer.

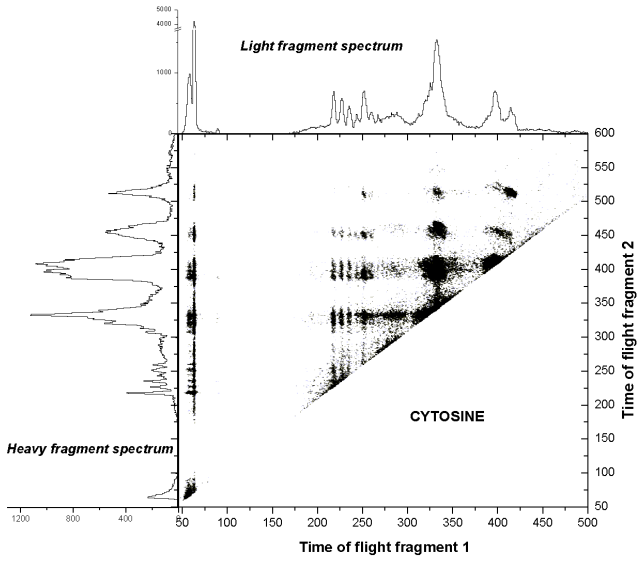

Fig 1 : 2 fragments correlation in H^+(100keV) +Cytosine collision

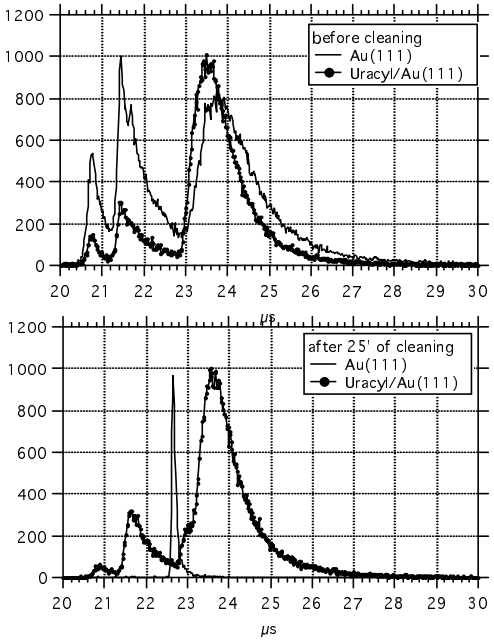

Fig 2 : scattered and recoil particles obtained in Ar^+ (4keV) on Uracil deposited on gold surface