

Direct damage mechanism of uridine irradiated with energetic heavy ions

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To study the direct damage mechanism of energetic heavy ions irradiating nucleotides, the residual ratios of uridine molecules after irradiation were measured with High performance Liquid Chromatography (HPLC). Results show that, irradiation damage probability depends on the electronic energy loss (S_e) of the incident ions, and it increases quickly when S_e is smaller than 400eV/nm, then it changes slowly while the S_e becomes larger further. The nuclear collision contribution could be neglected compared with that induced by the secondary electrons. This is not only because the magnitude of nuclear energy loss (S_n) is much smaller than that of S_e for MeV He and C ions, but also because the energy deposited thorough electronic process have a much higher efficiency than that through nuclear collision. In the nuclear collision process, one eV only can break 0.023 uridine molecules, while this value is as high as 0.149 molecule/eV in the electronic process.

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