Irradiation of Biomolecules by Low Energy Electrons

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Electron impact processes with molecules, including those which result in molecular dissociation, drive plenty of the important processes in many fundamental areas of technology, chemical engineering, the environment, the atmosphere, life and radiation sciences.
It is by now well known that low energy electrons (LEEs), the secondary species in the interaction of ionizing radiation with matter, efficiently produce structural and chemical modifications of many biostructures. These secondary electrons with a kinetic energy distribution up to 20 eV [1] are created in numbers of $5x10^4$ per MeV of deposited energy [2] that makes them the most abundant radiolytic species.
Recent years have witnessed a remarkable growth in the scientific interest in studying the low energy electron interactions with biologically relevant molecules. Among them, a wealth of experimental and theoretical data have been devoted to nucleic acids and their sub-units [3,4] in order to unravel the molecular mechanism how LEEs damage macromolecules.
In this talk I shall present experimental gas phase studies on dissociative electron attachment to heterocyclic organic compounds consisting either of a six-membered ring or a six-membered ring that is fused with imidazole ring. Such chemical compounds are frequently used to mimic the behavior of nucleobases and their metabolic products under reductive conditions. In particular, emphasis will be placed on the description of the formation of the transient negative ions and the comparison of the fragmentation patterns for a series of biologically relevant compounds.

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References

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