

Electron Driven Reactions to Boronic Acids

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Low energy electrons (LEE) has been shown to have a strong potential for driving local chemistry at the molecular level. DNA damage in living systems caused by ionising radiation is strongly related with secondary electrons interactions that attach to the DNA components or to the surrounding water molecules, driving bond dissociation. Pioneering studies of Sanche and co-workers [1,2] showed the effectiveness of LEE, with energies below the ionisation threshold, in inducing single and double strand breaks. The ability of LEE, (either free or bounded) in selectively attacking a specific bond in one molecule is highly effective. [3,4] Therefore, understanding the fragmentation pathways of (bio) molecules due to LEE is critical for molecular manipulation.

Boronic acids are known in literature since 1860. They were originally used as simple boron precursors and as intermediate agents in chemical synthesis.[5] In the last three decades, their potential as biomedical agents was discovered and explored. Now, they are considered powerful drug entities due to their unique properties such as stability, reactivity as mild Lewis acids and ease of handling. [6] Interactions of LEE with boron containing compounds can not only elucidate unknown fragmentation pathways but also design new reaction in drug design.

In the present communication we describe the role of electron transfer in potassium collisions with phenyl and cyclohexyl boronic acids, in order to better understand the dissociation channels, with relevance for medicinal chemistry applied to drug design. Differences in the dissociation channels between both boronic acids as a function of collision energy are discussed, as well as the influence of the boron hybridization in the formation of BO^- and BO_2^- fragments.

References

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