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Electron collisions with phenol: a joint experimental and theoretical investigation

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It has long been recognized that lignocellulosic biomass is a potential sustainable source of mixed sugars for fermentation to biofuels. During the last decades many technologies have been developed that allow this conversion process to occur and, nowadays, the clear objective is to make the use of such technologies cost-effective. Recently, it has been found that free-electrons and radical species formed within atmospheric plasmas have the ability to overcome the natural resistance of plant cell walls thus allowing for an enhancement of microbial and enzymatic deconstruction [1]. In this context, low-energy electrons which are produced within the plasma environment have the potential to induce breakage of chemical bonds through dissociative electron attachment, electron-impact excitation and other fragmentation processes.

In this work we report a joint experimental and theoretical effort in order to determine reliable elastic and electronically inelastic cross sections for low-energy electron collisions with phenol [2], a key structural subunit of lignin.

References

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