RESONANCE STUDIES IN VEHICULAR BIOFUEL MOLECULES

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A new apparatus is being commissioned within the Laboratório de Espectroscopia Atômica e Molecular (LEAM) at the Universidade Federal de Juiz de Fora. The aim of this new apparatus is to deliver comprehensive experimental electron scattering data from biofuel molecules. In addition to measuring electron scattering elastic, inelastic, integral and momentum transfer cross sections, this new apparatus will also be capable of giving information about the resultant molecules, fragments and ions from these electron interactions. This is achieved by integrating a quadrupole mass spectrometer (QMS) with the an electron spectrometer.

Preliminary studies have commenced so as to characterise the performance of the Hiden [1] QMS. Measurements of appearance potentials yield the ionisation energy and Wannier exponent of the target under investigation. Initial experiments from argon (Ar), nitrogen (N_2) and methane (CH_4) were used as calibration data. Our experimental values were compared to well known values within the literature [2-3]. This allowed the energy offset and energy resolution of the QMS to be characterised. Subsequently, new measurements have been taken from molecules relevant to biomass.

The experimental data presented here represents the first step toward integrating the QMS with the new electron spectrometer being built within LEAM. The QMS will be a powerful tool in providing information about the molecular and ionic products of electron interactions.

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References

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