

# CH<sub>3</sub> Neutral Radical Formation from CH<sub>4</sub> by Electron Impact

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Absolute electron-molecule impact dissociation cross sections are of interest in many fields of physics and chemistry, and in industrial applications such as chemical vapour deposition and plasma etching of microelectronic devices. However, experimental data, especially on cross sections for neutral radical formation, is scarce mainly because of the difficulties involved in the measurements of neutral fragments [1].

In this work, electron impact dissociation of CH<sub>4</sub> molecules into the CH<sub>3</sub> radicals have been investigated over the energy range 15.0 – 37.0 eV. The experimental procedure involves a dual-electron-beam in a two-stage collision system in conjunction with a quadrupole mass spectrometer (QMS). This method also uses the threshold-ionization mass spectrometry method [2]. Significant differences, in magnitudes of up to four times at 100 eV, exist between the only available absolute measurements by Sugai *et al.* [2] and Moore *et al.* [3]. Our data shows very close agreement with the Moore *et al.* data, which show reasonable consistency with the available CH<sub>4</sub> total dissociation data by Winters [4].

At the conference we will discuss these results in detail and also hope to present results on the angular distribution measurement spectra of these radicals.

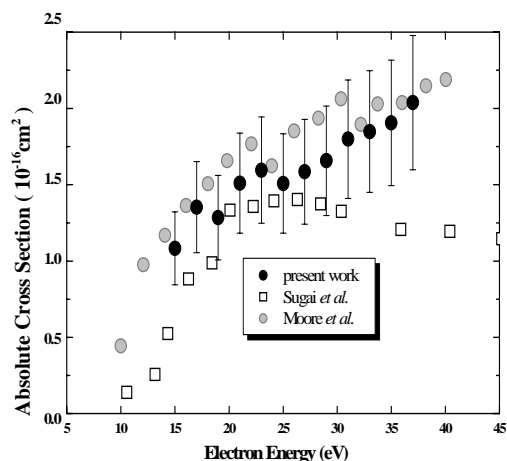


Fig. 1 Electron impact absolute cross sections for CH<sub>3</sub> neutral radical formation from CH<sub>4</sub> molecules.

## References

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