A COMPARATIVE STUDY OF DIFFERENTIAL CROSS SECTIONS FOR ELASTIC ELECTRON SCATTERING FROM INHALATION HALOGENATED ANESTHETICS AT 150 EV

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ABSTRACT

Inhalation halogenated anesthetics are of increasing environmental concern due to their high global warming potentials (GWPs), making the study of their interaction with low-energy electrons relevant for atmospheric processes. In this work, we report experimental differential cross sections (DCSs) for elastic electron scattering from three widely used anesthetics—sevoflurane, desflurane, and isoflurane. The measurements were performed using a crossed-beam setup under single-collision gas-phase conditions. The obtained angular distributions exhibit features related to molecular size, structure, and degree of halogenation. A comparative analysis reveals both similarities and notable differences among the molecules, indicating the influence of molecular geometry on scattering dynamics. The experimental results show overall good agreement with IAM-SCAR+I theoretical predictions, providing insight into interference and screening effects in electron–molecule scattering. These results contribute to the validation of theoretical models for complex molecular systems and improve the understanding of the environmental impact of inhalation halogenated anesthetics.

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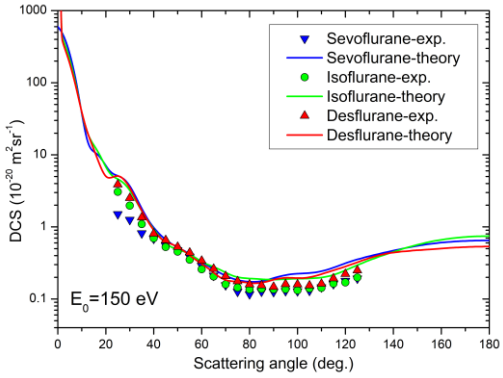

Figure 1 DCS for elastic electron scattering from sevoflurane, isoflurane and desflurane for 150eV incident electron energy.

Keywords: Anesthetics, electron scattering, cross section, global warming potential.