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STUDY OF ELASTIC ELECTRON SCATTERING FROM HALOGENATED ANESTHETIC MOLECULES IN GASEOUS PHASE AT 50 eV ELECTRON ENERGY

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In response to growing concerns over the environmental impact of anesthetic molecules on both global warming and ozone layer depletion, we undertook a collaborative study combining theoretical and experimental approaches to investigate elastic electron scattering from halothane, sevoflurane, isoflurane, and desflurane. These anesthetic gases, commonly excreted unchanged into the atmosphere after use, contribute to rising global concentrations of halogenated compounds, which possess high Global Warming Potentials (GWP) and significant Ozone Depletion Potentials (ODP). In our experimental work, elastic differential cross sections (DCS) were measured at an electron energy of 50 eV using a crossed-beam apparatus equipped with an electron gun, a capillary gas needle, and a channeltron detection system. The relative-flow method, with argon as a reference, was employed to establish the absolute scale of the cross sections. Complementary theoretical calculations were performed using the Independent Atom Model with the Screening Corrected Additivity Rule (IAM-SCAR+I), incorporating interference effects to provide a robust comparison with the experimental data. These findings contribute to a deeper understanding of the scattering dynamics of anesthetics and their potential atmospheric consequences.

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