

EJECTED ELECTRON SPECTRA FROM INHALATION ANESTHETIC MOLECULE N₂O

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ABSTRACT

Nitrous oxide (N₂O) has important uses in medicine as inhalation anesthetic molecule, industry and major environmental impact. N₂O, whose life is about 116 ± 9 years (Feng and Li, 2023) has been the predominant ozone-depleting substance throughout this century. Reportedly, in terms of ozone-depleting potentials (ODP), in 2020, the ODP-weighted anthropogenic N₂O emissions were more than two times that of all chlorofluorocarbons (CFCs). It strongly influences the troposphere heat budget, in particular, the increase of its anthropogenic emissions is leading to a significant increase of the Earth's surface temperature. In fact, long average atmospheric residence time (about 116 years), currently, makes it the third most important long-lived greenhouse gas after carbon dioxide and methane. For all these reasons the spectra of ejected electrons of N₂O in the region 3-24 eV have been investigated by using Omicron High Resolution Hemispherical Analyzer (OHRHA) at different incident energies from 100 eV down to 30 eV and two scattering angles (40° and 90°). Details of the experimental setup and procedures can be found in (Jureta et al., 2026). In the present experiment a non-monochromatic electron beam in the energy range (30 – 100) eV (± 0.4 eV) collides with an molecular beam effusing in the perpendicular direction to the scattering plane from a platinum-iridium non-biased needle with internal diameter of 0.5 mm. The interaction region has a cylindrical form (50 mm diameter) made by the two cylinders of thin μ -metal foils separated by 10 mm in the collision plane in order to avoid scattering of electrons from metal surfaces. The ejected electrons are detected by a high-resolution hemispherical analyzer with a mean radius of 125 mm equipped with seven channeltrons. The analyzer operates at pass energy of 1 eV with defined retarding ratio and defined magnification determined by a two stage 11 elements lens system. The spectra are obtained in the Constant Analyzer Energy (CAE) mode in which the analyzer pass energy was constant, while the kinetic energy was scanned by varying the retarding ratio of the lens stack. The background pressure in the vacuum chamber was $\sim 10^{-8}$ mbar, while the working pressure with N₂O gas in was $\sim 10^{-6}$.

Keywords: anesthetic molecules, ejected electron spectra.

Acknowledgments

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References

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