

are nitrogen atoms in the ^4S and/or ^2D configuration and ground state oxygen atoms.

The knowledge of the $\text{N}(^2\text{D})$ branching ratio is essential for the understanding of the ionospheric nitric oxide balance.

- 1 D. Kley, F. Stuhl and K. H. Welge,
Z. Naturforsch., 18a (1963) 906.

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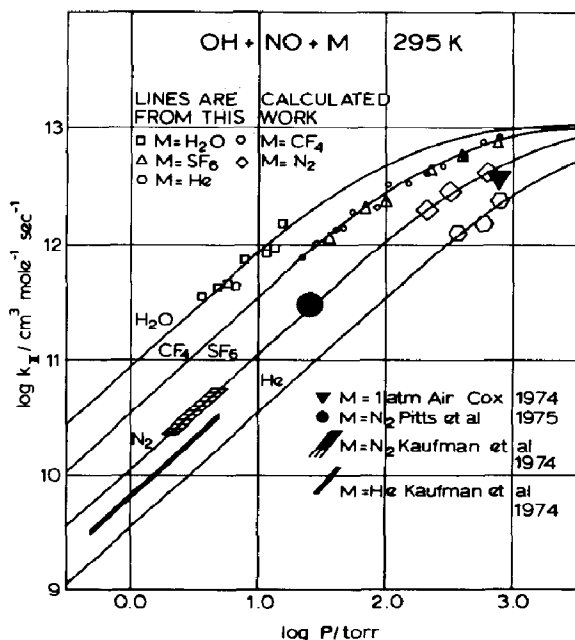
Hydroxyl Radical Combination with Nitric Oxide.



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The technique of flash photolysis of water vapour to produce hydroxyl radicals, coupled with resonance absorption ($\text{OH}^2\Sigma^+ \leftarrow \text{X}^2\Pi$ transition) detection of the transient hydroxyl decay has been used to study the reaction of hydroxyl with nitric oxide at 295 K. The reaction is termolecular and over the pressure range 50 - 760 Torr, changes from 3rd order to 2nd order kinetics.



Using gases assumed to be efficient third bodies (CF_4 and SF_6) the bimolecular reaction rate (k_{II}) dependence on the pressure of M was followed. The results when plotted in the Lindemann Hinshelwood form

$$1/k_{\text{II}} = 1/k_{\text{II}\infty} + \text{const}/P$$

yielded good linear plots which by extrapolation gave $k_{\text{II}\infty}$ at infinite pressure as $1.1 \pm 0.1 \cdot 10^{13} \text{ cm}^3 \text{ mole}^{-1} \text{ s}^{-1}$. The experimental value is very close to the value $1.2 \cdot 10^{13} \text{ cm}^3 \text{ mole}^{-1} \text{ s}^{-1}$ predicted by Tsang (1973) from RRKM theory.

By suitable fitting of the data obtained for other gases as M the relative efficiencies (collision adjusted) are $\text{H}_2\text{O} = 1.0$, $\text{CF}_4 = 0.41$, $\text{SF}_6 = 0.37$, $\text{N}_2 = 0.12$, $\text{He} = 0.02$.

The fitted curves and the data obtained in this study are plotted on the attached figure. The points displayed for nitrogen and helium are those at high pressure. Data were obtained over the entire pressure range, but the lower pressures require adjustment for the effect of water vapour and are not shown.

The agreement between this work and that of different sources is also shown on the attached figure for nitrogen.

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Nitric Oxides in the Stratosphere -- A Two Dimensional Atmospheric Model

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The global distribution of nitric oxides ($\text{NO}_x = \text{NO} + \text{NO}_2$) in the stratosphere (10 - 50 km) is investigated using an oxygen-hydrogen-nitrogen photochemical scheme and a parameterized two-dimensional transport model. The following assumptions are made to predict the distribution of NO_x : (1) The distribution of N_2O , which is assumed the main source of NO_x are not considered at this time. (2) The detailed treatment of the photodissociation processes in the O_2 -Schuman-Runge band region, especially the NO photodissociation in the δ -bands,