ADDITIONS AND CORRECTIONS

1996, Volume 100

Murthy S. Gudipati*,† and Daniel H. Katayama*,‡: Corrected Rate Constants for Collision-Induced Electronic Transitions from the N_2 $a^1\Pi_g$ ($v = 0$ and 1) Levels

Pages 7854-7858. Several years ago, one of the present authors (DHK) and colleagues published two papers[1,2] on the collision-induced electronic transitions (CIET) between the nested vibronic levels of the electronic states $a^1\Pi_g$ and $a'^1\Sigma_u^-$ of N_2. Using a double-resonance-enhanced multiphoton ionization (REMPI) technique, rate constants and branching ratios between the adjacent vibrational levels of the *a* and *a′* states were determined in these studies.

Recently, one of us (MSG) found an error in the straightforward numerical analysis of eq 8 in ref 2. This arithmetical error led to incorrect rate constants being reported for $N_2a(v = 1)$ in Table 1 of this reference. We correct these errors in the present work because of the important role played by these rate constants in modeling the earth's upper atmosphere.[3]

With the correct values for eq 8, eq 14 in ref 2 will become

$$A(t) = A'_0\{19.23\exp(-83.8k_{1\rightarrow1}[Q]t) + 63.8\exp(-0.77k_{1\rightarrow1}[Q]t)\} \quad (1)$$

and the second term dominates as a single exponential function, resulting in eq 16 of this reference being written as

$$1/\tau = 0.77k_{1\rightarrow1}[Q] \quad (2)$$

Using these equations, the rate constants and cross sections for $N_2a(v = 1)$ given in Table 1 of ref 2 are corrected and summarized in Table 1 here. We also include the rate constants and cross sections for $N_2a(v = 0)$ at room temperature given in Table 1 of ref 1, for which erroneous values of $k_{1\rightarrow0}$ and $\sigma_{1\rightarrow0}$ have been corrected.

TABLE 1: State-Specific Rate Constants and Cross Sections for Quenching the N_2 $a^1\Pi_g$($v = 0$ and 1) Levels as a Function of Collision Partner at 295 K[a]

data for $v = 1$

collision partner	$k_{1\rightarrow2}$ [b]	$\sigma_{1\rightarrow2}$	$k_{2\rightarrow1}$ [b]	$\sigma_{2\rightarrow1}$	$k_{1\rightarrow1}$ [c]	$\sigma_{1\rightarrow1}$
helium	7.8	5.8	25.3	19.5	0.39	0.29
argon	19.5	33	62	103	0.97	1.56
nitrogen	48.7	74	164	245	2.53	3.9

data for $v = 0$

collision partner	$k_{0\rightarrow1}$ [c]	$\sigma_{0\rightarrow1}$	$k_{1\rightarrow0}$ [c]	$\sigma_{1\rightarrow0}$	$k_{0\rightarrow0}$ [c]	$\sigma_{0\rightarrow0}$
helium	0.5	0.4	3.9	3.0	0.7	0.5
argon	0.8	1.3	6.6	10.8	1.2	2.0
nitrogen	1.7	2.6	14.3	21.5	2.6	3.9

[a] The rate constants, *k*, are in units of 10^{-11} molecule^{-1} s^{-1} cm^3, and the cross sections, σ, are in 10^{-16} cm^2. [b] The estimated error for these rate constants is ±1. [c] The estimated error for this rate constant is ±0.1.

Finally, in section IV (Discussion and Conclusions) of ref 2, there are typographical errors. The second sentence should read "... deactivation path from $a(v = 1)$ is to the $a'(v = 2$ and 1) levels, respectively." Similarly, the fourth sentence should read, "The branching ratio from $a(v = 1)$ to $a'(v = 2$ and 1) is independent of these collision partners...".

References and Notes

(1) Katayama. D. H.; Dentamaro, A. V.; Welsh, J. A. *J. Chem. Phys.* **1984**, *101*, 9422−9428.
(2) Katayama, D. H.; Dentamaro, A. V.; Welsh, J. A. *J. Phys. Chem.* **1996**, *100*, *7854*−7858.
(3) Eastes, R. W. *J. Geophys. Res.* **2000**, *105*, 18557−18573.

10.1021/jp0213046
Published on Web 07/10/2002

* To whom correspondence should be addressed.
† Institute of Physical Sciences and Technology, University of Maryland, College Park, MD 20742 (also at the Institute of Physical Chemistry, University of Cologne, Germany). E-mail: murthy.gudipati@sri.com.
‡ 1525 Ohialoke St., Honolulu, Hawaii 96821-1413. E-mail: janedan@lava.net.