

tion of the viscosity behaviour in mixed liquids has its roots in the gelation (flocculation) capacity of the system, and such solutions above the minimum gelation concentration may be regarded in a limited sense as incipient gels. In other words, in solutions of some concentration and in the poorer solvents, such as, for example, in the mixture two molecules water one molecule alcohol, the solute molecules are to a greater or less extent in an aggregated state.

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¹ Mardles, *Trans. Farad. Soc.*, **38**, 47 (1942).
² Palit, *J. Indian Chem. Soc.*, **19**, No. 10, 435 (1942).

Singlet Terms in the Spectrum of Molecular Nitrogen

IN recent papers communicated at about the same date, one of us¹ has reported a number of singlet band systems in the absorption spectrum of nitrogen in the extreme ultra-violet, while the other² has given details of several singlet systems obtained in emission in the near ultra-violet. These two sets of systems do not have any electronic levels in common as they are of different symmetry, but unfortunately the same letters have been used by both of us in designating some of the electronic states.

To avoid confusion, we suggest that primes be affixed for the upper states *p*, *q*, *r*, *s* and *t* of the new emission systems, while the lower level of the Fifth Positive (van der Ziel) system and of Kaplan's systems be designated *a'* instead of *v*. (*a'* and *a* would then occupy a position roughly analogous to that of *b'* and *b*.) We shall also refer to state *o'* as *o* (without prime), as it is now¹ scarcely necessary to emphasize its distinction from an earlier, but discarded, *o* grouping.

The known singlet states of molecular nitrogen are listed here using the revised notation. For convenience we include an abbreviated table of the most important constants, in which some of the values have been slightly 'rounded'. The vibrational constants of the normal state, and ν_0 for $a^1\Pi$ and $b'^1\Sigma$ are from Birge and Hopfield³. The value for B_0 of $X^1\Sigma$ has been discussed previously (ref. 1, footnote 37). Levels *g*, *f* and *h*, which may not all be separate states¹, have been extrapolated from measurements by Watson and Koontz⁴. The constants for *b'* are from Tschul-anowsky⁵; for other states designated by primes and for *a*, *w*, *x* and *y*, they are derived from a study of emission systems in the near ultra-violet². Absorption systems in the far ultra-violet provide slightly less accurate data for the remaining states¹. Values of *B* and ω enclosed in parentheses correspond to the stronger absorption bands of a *v'*-progression for which the (0, 0) band was probably not observed; they are presumed to be associated with levels for which $r'_{\min} \sim r_0$. In these cases, estimated potential minima ($\sim \nu_e$) are given¹.

The apparent absence of absorption to levels *x* and *y* makes it likely that these states are of *g* symmetry. State *a'* would then be of type $^1\Sigma_u^-$, and would probably correspond to one of this character predicted on theoretical grounds, namely, by addition of a $\sigma_2 2p$ (that is, anti-bonding $\pi\pi$) electron to the low-lying $^2\Pi_u$ state⁶ of N_2^+ . Level *a'* would then be metastable, irrespective of whether it lies above or below $a^1\Pi_u$, and may thus be of importance in the formation of active nitrogen.

State	ν_0 ($\sim \nu_e$)	B_0 (B_0)	$\omega_{1,2}$ (ω_0)
<i>v</i> $^1\Sigma_u^+$	(119,000) ?	(≤ 1.9)	(925)
<i>u</i> $^1\Sigma_u^+$	(116,000)	(1.07)	(530)
<i>t</i> $^1\Sigma_u^+$	(115,000) ?	(1.04)	(460)
<i>s</i> $^1\Sigma_u^+$	(113,000) ?	(1.06)	(500)
<i>t'</i> $^1\Sigma_g^-$	112,774	1.63	
<i>h</i> $^1\Sigma_u^+$	112,770	≤ 1.9	
<i>s'</i> $^1\Sigma_g^-$	110,662	1.58 ₈	
<i>f</i> $^1\Sigma_u^+$	110,190 <i>E</i>	≤ 1.9	
<i>g</i> $^1\Sigma_u^+$	108,950 <i>E</i>	< 1.99	
<i>o</i> $^1\Sigma_u^+$	107,655 <i>H</i> *	≤ 1.8	1918
<i>r</i> $^1\Sigma_u^+$	(107,000)	(1.06)	(630)
<i>y</i> $^1\Pi_g$ (or $^1\Pi_u$)	<i>a'</i> + 46,420	1.80	1705 ?
<i>r'</i> $^1\Sigma_g^-$	106,373	1.67	
<i>x</i> $^1\Sigma_g^-$ (or $^1\Sigma_u^+$)	<i>a'</i> + 45,463	1.73 ₈	1869
<i>q'</i> $^1\Pi_g$	05,351	1.36 ₈	
<i>q</i> $^1\Pi_u$	(105,000)	(1.09)	(670)
<i>p'</i> $^1\Sigma_g^-$	104,328	1.93	
<i>c</i> $^1\Pi_u$	104,316 <i>H</i>	1.92	2180
<i>p</i> $^1\Pi_u$	(104,000)	(1.21)	(730)
<i>b'</i> $^1\Sigma_u^+$	103,678 <i>E</i>	1.144	741.3
<i>m</i> $^1\Sigma_u^+$ (or $^1\Pi_u$)	(103,000)	(1.35)	(760)
<i>b</i> $^1\Pi_u$	101,454 <i>H</i>	1.41	698
<i>w</i> $^1\Sigma_g^-$ (or $^1\Sigma_u^+$)	<i>a'</i> + 40,914	> 1.47	1711 ?
<i>j</i> $^1\Sigma_u^+$	(99,000) ?	(1.45)	
<i>i</i> $^1\Sigma_u^+$	(97,000) ?	(~ 1.5) ?	(670)
<i>a</i> $^1\Pi_u$	68,956	1.61	1666.7
<i>a'</i> $^1\Sigma_u^+$ (or $^1\Sigma_g^-$)	$\sim 60,000$	1.47	1504
<i>X</i> $^1\Sigma_g^-$	0	1.99 ₈	2330.7

H, observed head of (0,0) band. *E*, extrapolated head of (0,0) band.

* or $\nu_0 = 105,693$, $\omega_{1,2} = 1962$.

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¹ Worley, R. E., *Phys. Rev.*, **64**, 207 (1943).

² Gaydon, A. G., *Proc. Roy. Soc., A*, **182**, 286 (1944).

³ Birge, R. T., and Hopfield, J. J., *Astrophys. J.*, **68**, 257 (1928).
The value of ν_0 for $a^1\Pi$ is derived from the head measurement and the rotational constants, account being taken of the revised wave-length standards reported on p. 265 of the reference.

⁴ Watson, W. W., and Koontz, P. G., *Phys. Rev.*, **46**, 32 (1934).

⁵ Tschul-anowsky, W. M., *Bull. Acad. Sci. U.R.S.S., Classe sci. math. et nat.*, 1313 (1935).

⁶ Mulliken, R. S., *Rev. Mod. Phys.*, **4**, 52 (1932).

The Black Redstart

IN his interesting article on the black redstart in NATURE of May 27, Mr. Fitter says that it "was not known to breed anywhere in the British Isles before 1923". It is well over forty years ago that I watched a pair of these birds throughout their nesting activities at Bush Hill Park, near Enfield in Middlesex. I regret that in the end I took the clutch of four eggs. These eggs were sold at Stevens' auction on July 16, 1918 (Sale No. 12,981, Lot 53) on my leaving England and after this interval I can give no more precise data.

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