The Heat Capacity Curves of the Simpler Gases, VI. A Correction

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The Hamiltonian function (18) is invariant under the twenty-four operations of the tetrahedral group, T_d. It remains to determine to which irreducible representations of this group the singlet states belong. The symmetry of the energy matrix in β and β' introduces another symmetry element, the inversion $J=(18)(27)(36)(45)$, which, applied to (18), interchanges β and β'. The resultant group of forty-eight elements is evidently isomorphic to the cubic holohedral group, O_h. Referring to Mulliken's tables for the group T_d, we see that it differs from the cubic group O only by the inclusion of an inversion in classes C_3 and C_4. The group obtained by adding an inversion to T_d consequently differs from O_h only in that classes C_3 and JC_3, C_4 and JC_4 are interchanged. It follows immediately that the states of the cube labelled ${}^1A_1$, ${}^1E$, ${}^1T_2$, ${}^1JA_1$, ${}^1JT_2$, correspond to the states ${}^1A_1$, ${}^1E$, ${}^1T_2$, ${}^1A_2$, ${}^1T_1$, respectively, of the tetrahedron.

The energies of the ${}^1A_1$ levels of the tetrahedron have also been computed by Seitz and Sherman,[12] while Eyring, Frost and Turkevich[15] have given formulas for the singlet states. A typographical error should be noted in the latter authors' formula for ${}^1A_2$ (Γ_2 in their notation). Their results for ${}^1E(\Gamma_3)$ are also in error.

I am deeply in debt to Professor J. H. Van Vleck, both for the interest he has taken in this work, and for his kindness in criticizing the manuscript.

[15] H. Eyring, A. A. Frost and J. Turkevich, J. Chem. Phys. **1**, 777 (1933).

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IN our paper of the above title a contribution of $R \ln 2$, resulting from the electron spin of the deuterium atom, was omitted from the free energy values of atomic deuterium, through an oversight. To correct for this omission all entries in the fourth column of Table IV (p. 392) should be increased by 1.377 units. This correction also influences Table X (p. 394). The corrected Table X is as follows:

TABLE X. *Dissociation constants and percentage dissociation of hydrogen.*

T, °K	K		
	H^1H^1	H^1H^2	H^2H^2
1000	64.49×10^{-19}	24.78×10^{-19}	37.08×10^{-19}
1500	36.00×10^{-11}	15.66×10^{-11}	26.99×10^{-11}
2000	29.60×10^{-7}	13.62×10^{-7}	24.91×10^{-7}
2500	6.915×10^{-4}	3.276×10^{-4}	6.168×10^{-4}
3000	26.87×10^{-3}	12.95×10^{-3}	24.75×10^{-3}
T, °K	Percent dissociation (1 atmosphere)		
	H^1H^1	H^1H^2	H^2H^2
1000	13×10^{-8}	7.9×10^{-8}	9.6×10^{-8}
1500	9.5×10^{-4}	6.3×10^{-4}	8.2×10^{-4}
2000	8.6×10^{-2}	5.8×10^{-2}	7.8×10^{-2}
2500	1.31	0.91	1.24
3000	8.1	5.66	7.9

Except for a portion of the discussion in the paragraph which begins five lines below Table X, no other portions of our paper are influenced by this correction.