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THE DISSOCIATION ENERGIES OF SOME COMMON MOLECULES

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Author
Brewer, Leo.

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Leo Brewer

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THE DISSOCIATION ENERGIES OF SOME COMMON MOLECULES

Leo Brewer
Radiation Laboratory and Department of Chemistry and Chemical Engineering
University of California, Berkeley, California

January, 1955

Paper 5 of Vol. 19B of the National Nuclear Energies Series, "The Chemistry and Metallurgy of Miscellaneous Materials: Thermodynamics" edited by L. L. Quill, McGraw-Hill, 1950, gives the heats of formation and dissociation energies of many gaseous molecules. Recent data have resulted in minor changes in some of these data. The following table gives the most recent values for the dissociation energies of the tabulated gaseous compounds. The energies are for the dissociation of the molecule completely to monatomic gaseous species in their ground electron state.

Where the data are derived from spectroscopic data, the values are given in kaysers or cm^{-1}, the original units of the data. Most other data were obtained by combination of heats of formation of the compounds from the elements with dissociation heats of the elements. The units used are as follows:

23,062.4 cal/abs. volt equiv.

2.858917 cal cm/mole

8066.8 K per e.v.

Do, Dissociation Energy to Atomic Products at 0°K

December 1, 1954

	K (cm^{-1})	e.v.	kcal.
H_2	36,116 ± 10	4.477 ± 0.001	103.25 ± 0.03
N_2	78,717 ± 40	9.758 ± 0.005	225.04 ± 0.1
O_2	41,261 ± 15	5.115 ± 0.002	117.96 ± 0.04
O_3		6.17 ± 0.04	142.3 ± 1
H_2O		9.511 ± 0.001	219.34 ± 0.03
OH		4.45 ± 0.2	103. ± 5
CO	89,460 ± 150	11.090 ± 0.019	255.76 ± 0.43
CO_2		16.542 ± 0.02	381.51 ± 0.5
NO		6.503 ± 0.004	149.98 ± 0.08
N_2O		11.432 ± 0.006	263.63 ± 0.1
NO_2		9.615 ± 0.004	221.75 ± 0.1
CO^+	67,309 ± 300	8.344 ± 0.037	192.43 ± 0.9
N_2^+	70,396 ± 40	8.727 ± 0.005	201.26 ± 0.1
NH_2			173.
NH_3			276.77 ± 0.1
CH_4			392.07 ± 0.5
CH_3			291. ± 1
C_2N_2			490.7 ± 1.5

L_C = 169.58 ± 0.45 kcals.

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