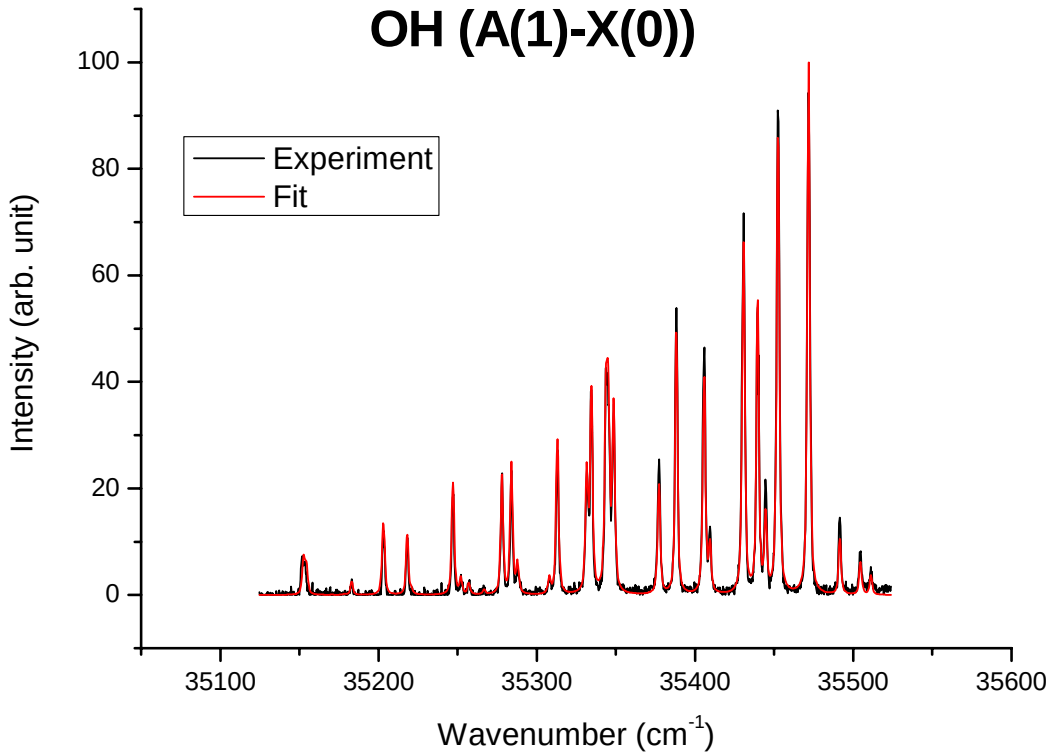
Molecular constants of diatomic molecules

The following pages are copies from the book Constants of Diatomic Molecules by Huber and Herzberg, containing information about the most common diatomic molecules of interest in combustion.

For each molecule there is information in a large number of columns. The parameters T_e, ω_e, $\omega_e x_e$, B_e, D_e, and ν_{oo} are given in the unit cm^{-1} (which is a way to express energy). The column with references needs no attention for the course exercises.



State	T_e	ω_e	$\omega_e x_e$	B_e	α_e	D_e ($10^{-4}cm^{-1}$)	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
NH		μ = 0.94016028		$D_0^0 \leq 3.47$ eV[a]		I.P. = (13.63) eV[b]				MAR 1977 A
Theoretical potential functions and spectroscopic constants for the ground and excited states: (21)(44)(46); (32)(36)(51).										
d $^1\Gamma^+$	83160	2672.6 Σ	71.2	14.390[c]	0.621	16.0[d]	1.1163	d[e]→c,[m] V	39512.2$_6$ Σ	(5)• (19) (23)(27) (55)•
c $^1\Pi$	(43744)	[2122.6$_4$] Σ	f	14.537[ghi]	0.593[j]	[22.0][k]	1.110$_6$	d[e]→b,[m] R	61619.6$_0$ Σ	(29)(55)•
								c[f]→b,[m] R	22106.6$_2$ Σ	(4)• (26)•
								c[f]→a,[m] R	30755.5$_4$ Σ	(1)(2)• (5) (14)•
A $^3\Pi_1$	29807.4[n]	3231.2 Σ	98.6	16.6745[opl]	0.7454	[17.80][q]	1.0369$_8$	A[r]↔X,[m] *	29776.76 Σ	(3)(8)• (15) (35)
b $^1\Sigma^+$	21202	3352.4 Σ	74.2$_4$[t]	16.705[u]	0.591	16.0[v]	1.0360	b[w]→X, *	21238 Σ	(45)
a $^1\Delta$	(12566)[x]	[3188] Σ	(68)[y]	[16.439][i]	0.66	[16.2]	1.03$_4$	(a−X)	12589[z]	
X $^3\Sigma^-$	0	3282.2$_7$ Σ	78.3$_5$	16.6993[a']	0.6490	[17.097][b']	1.0362$_1$	Rotation sp.[c']		(48)(54)
								Fundamental b. in matrices (45a)(55a)		

State	T_e	ω_e	$\omega_e x_e$	B_e	α_e	D_e ($10^{-6}cm^{-1}$)	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
CN		μ = 6.46219329		D_0^0 = 7.7$_6$ eV[a]		I.P. = 14.1$_7$ eV[b]				SEP 1976 A
Theoretical work (24)(46)(48)(50)(63). RKR potential curves (15)(44)(53). Franck-Condon factors (21a)(53), and ref. in (27)(44).										
J $^2\Delta_1$	65258.19[c]	1121.76 Σ	14.203[d]	1.305$_2$	0.020$_8$	5.8	1.413$_7$	J→A, R	55667.14[e] Σ	(8)•
H $^2\Pi_{(r)}$	[61969.7][f]			[1.520]			[1.310]	H→B, R	35140.8$_4$[e] Σ	(7)
G $^2\Pi$	[61655.0][gh]			[1.085][f]			[1.551]	G→B, R	34826.1$_0$[e] Σ	(7)(43)
F $^2\Delta_r$	60095.6$_4$[i]	1239.5$_0$ Σ	12.7$_5$	1.3834	0.0187	7	1.3732	F→A, R	50563.8$_0$[e] Σ	(7)• (22) (47)
E $^2\Sigma^+$	59151.1$_8$	1681.43 Σ	3.60[j]	1.4871	0.00643[k]	5.0	1.3245	E→A, R	49842.4$_7$	(8)• (47)
								E↔X, R	58959.55 Σ	(8)• (43)•
D $^2\Pi_1$	54486.3[l]	1004.7$_1$[m] Σ	8.7$_8$	1.162[m]	0.013	7	1.498	D→A, R	44838.0$_8$[e] Σ	(7)•
a $^4\Sigma^{(+)}$	(32400)[n]							D→X, R	53955.4$_6$	(7)•
B $^2\Sigma^+$	25752.0	2163.9[o] Σ	20.2[e']	1.973[o]	0.023[e']	[6.6]	1.150	B→A, V	16680.4$_6$	(31)(54)•
[For a comprehensive review of molecular data on the B−X system including a bibliography of references prior to 1972 see (44)].								B[p]↔X,[q] V$_R$	25797.84 Σ	(1)• (2)• (4a)(5)(7) (9)(32)(54)
A $^2\Pi_1$	9245.28[r]	1812.5$_6$[m] Σ	12.60$_9$[t]	1.7151[s]	0.01708[u]	5.93[av]	1.2333	A[w]↔X,[x] R	9117.35[e] Σ	(3)• (3a) (4b)(7)(9) (16)• (25) (32)(44)•
[For a useful compilation of molecular data on the A−X system and a bibliography of references prior to 1971 see (44).]										
								IR fundamental b.		(62)(70)
X $^2\Sigma^+$	0	2068.59 Σ	13.087[y]	1.8997$_4$[z]	0.01736$_9$[a']	6.40[b']	1.1718$_2$	Microwave sp.[c']		(66)(71)
								ESR sp.[d']		(41)(73)

State	T_e	ω_e	$\omega_e x_e$	B_e	α_e	D_e ($10^{-4}cm^{-1}$)	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
CH		μ = 0.92974056		D_0^0 = 3.46$_5$ eV[a]		I.P. = 10.64 eV[b]				AUG 1975 A
Several unassigned absorption bands[c] above 80000 cm^{-1}.										
Rydberg series joining on to G, ν = 85850 − R/(n − 0.09)^2; n = 3,4,5,6										(26)
G [d]	[74373]									(26)•
F $^2\Sigma^+$	[65945]			[12.17][e]			[1.221]	G← X,	72960	(26)•
E $^2\Sigma^-$	[65625]			[12.6][fg]			[1.20]	F← X, R	64531.5[f] Σ	(26)•
D $^2\Pi_1$	[60394][h]			[13.7][fg]			[1.15]	E← X, R	64211.7[f] Σ	(26)•
								D← B, V	33282.8[f] Σ	(26)•
C $^2\Sigma^+$	31801.5	2840.2 Σ	125.9$_6$[i]	14.603[jk]	0.7185[l]	[15.55][m]	1.1143	D← X,	58981.0[f] Σ	(26)•
								C[n]↔X,[o] V$_R$	31778.1[f] Σ	(1)(3)(10)• (26)
B $^2\Sigma^-$	(26044)	[1794.9][p] Σ		[12.645][qk]	r	[22.2][s]	[1.1975]	B[t]↔X,[o] R	25698.2[f] Σ	(2)• (3) (10)• (25)•
A $^2\Delta$	23189.8[u]	2930.7 Σ	96.65	14.934[vk]	0.697	15.4[w]	1.1019	A[x]↔X,[o] V	23217.5[f] Σ	(3)(6)(10)• (12)•
a $^4\Sigma^-$	(5844)	(3145)	(72)	(15.4)	(0.55)		(1.08$_5$)		5985[y]	(48)
X $^2\Pi_r$	0[z]	2858.5 Σ	63.0$_2$	14.457[a'b'k]	0.534	14.5	1.1199	Λ doubling sp.[a']		(39)
								Ab initio calculations: ref. in (44)		

State	T_e	ω_e	$\omega_e x_e$	B_e	α_e	D_e ($10^{-2}cm^{-1}$)	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
H_2										
Q ($^1\Pi_g$)[a]	(113163)	[742]		[(16.3)]			[(1.43)]	Q→B, R	21151.$_1$	(4)(24)
B' $^1\Sigma_u^+$ 3pδ	111642.$_8$[b]	2039.52	83.406[c]	26.70$_5$[e]	2.781[d]	[1.2][f]	1.119$_2$	B'→E,F	11311.5[g]	(34)
								B'← X,[h] R	110478.2	(40)(44)(46)
P^1 } $^1\Sigma_g^+$ [2pσ^2	100911[j]	[1199][i]		B_4 = 6.24[k]			r_4 = 2.31$_5$[k]	F→B,[l] R	ν_{40}=13635.1	(14)(34)
E^1 } [2sσ	100082.3[m]	2588.9[n]	130.5[m]	32.68[m]	1.818[m]	[2.28][m]	1.011$_8$	E→B,[l] V	8961.23	(8)(22)(24) (34)
C $^1\Pi_u$ 2pπ	100089.8[n]	2443.77	69.524[op]	31.362$_9$[p]	1.664$_7$[q]	2.23[r]	1.0327$_9$	C[s]↔X,[t] R	99120.1$_7$[n]	(12)(37)(44) (129)
								Werner b.		
B $^1\Sigma_u^+$ 2pσ	91700.0[a]	1358.09	20.888[b]	20.015$_4$[c]	1.1845[d]	1.625[e]	1.2928$_2$	B[f]↔X,[gh] R	90203.3$_5$	(25)(77)(129)
								Lyman b.		
X $^1\Sigma_g^+$ 1sσ^2	0	4401.21$_3$	121.33$_6$[i]	60.853$_0$[k]	3.062$_2$[j]	4.71[f]	0.74144	Quadrupole[m] and field-induced sp..[n]		(15)(48) (26)(56)(74)
								Raman sp.[o]		(23)(56)
								Rotational[p] and nuclear rf magn. reson.		(17a)(21) (17)(19)

State	T_e	ω_e	$\omega_e x_e$	B_e	α_e	D_e ($10^{-4}cm^{-1}$)	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
OH		μ = 0.94808710		D_0^0 = 4.392 eV[a]		I.P. = 12.9$_0$ eV[b]				MAY 1977
		Theoretical potential functions for 48 states (92); for X $^2\Pi$ and A $^2\Sigma^+$ see (112)(113)(118).								
C $^2\Sigma^+$	89459.$_1$	1232.9 Σ 19.1		4.247[cd]	0.078	2	2.046$_1$	C[e]→A,[m] R	55820.7 Σ	(20)(42)(64)•
		Strong many-line spectrum 1900 - 1700 Å, tentative identification.						(C→X)[e]	(88223)	(20)(45)•
D $^2\Sigma^-$	(82130)	(2954)		[15.2179][f]		[16.16]	[1.0809$_3$]	D←X,[f] R	81759.7$_8$[h] Σ	(106)
B $^2\Sigma^+$	69774	[660.0] Σ	i	[5.086][jd]	k	[9.29][f]	[1.869$_8$]	B→A,[m] R	35965.5 Σ	(16)(20)(33) (42)• (59)• (64)• (73)
A $^2\Sigma^+$	32684.1	3178.8$_6$ Σ	92.91$_7$[n]	17.358[opqd]	0.786$_8$[r]	[20.39][s]	1.0121	A[t]↔X,[u] R	32402.3$_9$[h] Σ	(3)(57)(64)•
X $^2\Pi_i$	0[v]	3737.76$_1$ Σ	84.881$_3$[w]	18.910$_8$[xd]	0.7242[y]	19.38[t]	0.96966	$\frac{1}{2}$ ← $\frac{1}{2}$ a'	126.2)	(69a)(90)

State	T_e	ω_e	$\omega_e x_e$	B_e	α_e	D_e ($10^{-6}cm^{-1}$)	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
O_2										
F'	[87510]	Group of six line-like features similar to F← X.						F'← X,	86720	(17)(173)•
F $^3\Pi_u$	(85868) (85780) (85689)	[2008] M [2000] M [2001] M	v=1 diffuse	[1.434] [1.398] [1.352]		[11] [6.0] [5.3]	[1.212] [1.228] [1.249]	F← X,	86085.0[a] Σ 85992.6[a] Σ 85902.3 Σ	(136)(151) (173)•
ε $^3\Sigma_u^-$	(79883)	[2547]	b	b				E← X, R	80369[b]	(6)• (17) (150)(173)•
f $^1\Sigma_u^+$ [c]	76091	1927	19.0	1.703[d]	0.020	e	1.113	f← b, V	63141.5 Σ	(84)
								f← X, V	76262.4[f]	(84)(111)• (173)•
D ($^3\Sigma_u^+$) [g]	(75260)	1957	19.7	1.73[h]	0.025	i	1.10$_4$	D← X, V	(75450)	(84)(111)• (173)•
e ($^1\Delta_{2u}$)	(75254)	[1830] M		[1.682] (diffuse lines)			[1.119]	e ← a, V	67499.6[k] Σ	(84)(118)
e'($^3\Delta_{2u}$)	(74915)	[2052] M	j					e'	67272 [k] M	(146)(152)
d ($^1\Pi_g$)	(69180)	[1860]	i					(d← X)	69320[m]	(192)
C ($^3\Pi_g$)	(65530)	[1840]	n					(C← X)	65670[m]	(150)(171)
B $^3\Sigma_u^-$	49793.28	709.31[o] Σ	10.65[o]	0.8190$_2$[opq]	0.01206[o]	4.55[r]	1.60426	B↔ X,[st] R	49358.15 Σ	(5)•(7)•(21)• (78)• (96)• (115)(168)
								Schumann-Runge b.		
A $^3\Sigma_u^+$	35397.8	799.07 Σ	12.16[a]	0.9106	0.0141$_6$[a]	4.7[b]	1.5215	(A→b)[c]	(21886)	
								(A→a)[c]	(27125)	
								A↔X,[de] R	35007.1$_5$ Σ	(16)• (22)• (89)•
								Herzberg I b.		
A' $^3\Delta_u$	(34690)[f]	(850)[g]	(20)[g]	(0.96)[h]	(0.026$_2$)[h]		(1.48)	(A'→a)[c]	(26440)	
								A'← X,[ij] R	(34320)[g]	(19)•
								Herzberg III b.		
c $^1\Sigma_u^-$	33057.$_3$	794.2$_9$ Σ	12.73$_6$[k]	0.915$_5$	0.0139$_1$[k]	[7.$_4$]	1.517$_4$	c→a,[f]	(24782)	(188)
								c↔X,[m] R	32664.$_1$ Σ	(19)• (87)
								Herzberg II b.		
b $^1\Sigma_g^+$	13195.1	1432.77[a] Σ	14.00[a]	1.4003$_7$[a]	0.01820[a]	5.351[b]	1.22688	b→a,[c]	5238.5	(40)
								b↔X,[de] R	13120.91[f] Σ	(12)•
								Atmospheric oxygen b.		
a $^1\Delta_g$	7918.1	[1483.5$_0$] Σ (12.$_9$)		1.4264	0.0171	[4.86]	1.2155$_3$	a[g]↔X,[he] R	7882.39 Σ	(10)•
								IR atmosph. oxygen b.		
X $^3\Sigma_g^-$	0	1580.19$_3$ Σ	11.98$_1$[i]	[1.4376766][j] B_e = 1.44563	0.0159$_3$[kl]	[4.839][jl]	1.20752	Rot.-vibr. sp. (collision induced)		(12a)(75a) (142)
								Rotation sp.[mn]		(94)(105)
								Spin reorientation (fine structure) sp.[mo]		(20)(41)(76) (120)(159)
								Raman sp.[p]		(38)• (124)• (162)(183)•
								EPR sp.		(25)(138)(154)

State	T_e	ω_e	$\omega_e x_e$	B_e	α_e	D_e ($10^{-6}cm^{-1}$)	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
C_2		μ = 6.00000000		D_0^0 = 6.21 eV[a]		I.P. = 12.15 eV[b]				JUL 1976
		Theoretical work and potential functions (16)(29)(35)(49).								
P $^1\Sigma_u$	[75456.9]	[1557.5] Σ		1.645	0.019	6	1.307	P← X, R	74532.9 Σ	(51)•
g $^3\Delta_g$	[73183.6][c]	[1458.06] Σ		1.5238	0.0170	6.6	1.3579	g← a, R	71649.6 Σ	(51)•
f $^3\Sigma_g^-$	71045.8	1360.5 Σ	14.8	1.448[d]	0.040[e]	10	1.393	f← a, R	70188.4 Σ	(51)•
E $^1\Sigma_g^+$	55034.7	1671.5$_0$ Σ	40.02[f]	1.7897	0.0387[g]	8.3[h]	1.2529	E→A,[l] V	46668.3 Σ	(10)•
D $^1\Sigma_u^+$	43239.4$_4$	1829.57 Σ	13.94	1.8332[j]	0.0196	7.32[j]	1.2380	D↔ X,[k]	43226.7$_4$[j] Σ	(2)• (11) (46)
								Mulliken b.		
a $^3\Pi_g$	40796.65[f]	1106.56 Σ	39.260[m]	1.1922	0.0242	6.3[n]	1.5351	a→a,[o] R	39806.46 Σ	(7)•
								Fox-Herzberg b.		
C' $^1\Pi_g$		Preliminary constants from perturbations in C $^1\Pi_g$; see (40).								
C $^1\Pi_g$	34261.3	1809.1 Σ	15.81[p]	1.7834	0.0180[p]	6.8	1.2552	C→A,[q] v_R	25969.19 Σ	(1)(3)(8)
								Deslandres-d'Azambuja b.		(50)
d $^3\Pi_g$	20022.50[r]	1788.22 Σ	16.440[s]	1.7527[t]	0.01608[u]	6.7$_4$[v]	1.2661	d↔ a,[w] v_R	19378.44 Σ	(6)• (25) (42)• (45)
								Swan b.		
								(d← X)[x]		
c $^3\Sigma_u^+$	13312.$_1$	1961.$_6$[y]	13.$_7$	1.87[y]			1.23			
A $^1\Pi_u$	8391.00	1608.35 Σ	12.07$_8$[z]	1.6163$_4$[a']	0.0168$_6$[z]	6.44[z]	1.3184$_3$	A↔ X,[b'] R	8268.16 Σ	(18)
								Phillips b.		
b $^3\Sigma_g^-$	6434.2$_7$	1470.4$_5$ Σ	11.1$_9$[c']	1.4985$_2$[d']	0.0163[e']	6.22	1.3592$_8$	b→a,[f'] R	5532.7 Σ	(17)•
								Ballik-Ramsay b.		
a $^3\Pi_u$	716.2$_4$[g']	1641.35 Σ	11.67	1.6324$_6$[h']	0.01661	6.44	1.3119$_0$			
X $^1\Sigma_g^+$	0	1854.71 Σ	13.34$_0$[i']	1.8198$_4$	0.0176$_5$[i']	6.92[i']	1.2425$_3$			

N_2

State	T_e	ω_e		$\omega_e x_e$	B_e	α_e	D_e (10^{-6} cm^{-1})	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
$B'\ ^3\Sigma_u^-$	66272.4$_7$	1516.88	Z	12.18$_1$[a]	1.473$_3$[b]	0.0166$_6$[c]	(5.56)	1.278$_4$	$B'\to B$, "γ" bands,[d]	R 6545.5 (Z)	(32)(36) (182)
									$B'\leftrightarrow X$,[e]	R 65852.35 Z	(30)• (35)
									Ogawa-Tanaka-Wilkinson b.		(66)• (149) (155)
$W\ ^3\Delta_u$	59805	1501.$_4$	(Z)	11.6					$W\leftrightarrow B$, R,V	73	(102)(124)
									Wu-Benesch b.		(131)(157)
									$W\leftrightarrow X$,[f]	R 59380	(123)• (155)
									Saum-Benesch b.		
$B\ ^3\Pi_g$	59619.3$_5$[g]	1733.39	Z	14.122[h]	1.6374$_5$[i]	0.0179$_1$[j]	[5.9]	1.2126$_0$	$B^k\leftrightarrow A$,[f] 1st pos. gr.	V 9552.0$_3$ Z	(29)(196)
									$B\leftrightarrow X$,[m]	R 59306.81 Z	(40)
									Wilkinson b.		
$A\ ^3\Sigma_u^+$	50203.6$_3$	1460.64	Z	13.87$_2$[n]	1.4546[o]	0.0180[p]	[6.1$_5$]	1.2866	$A^q\leftrightarrow X$,[m]	R 49754.78 Z	(29)(70)(85)
									Vegard-Kaplan b.		
$X\ ^1\Sigma_g^+$	0	2358.57	Z	14.324[r]	1.99824$_1$[s]	0.017318[s]	[5.76]	1.09768$_5$	Rot.-vibr.[t] and rot. sp.,		
									- pressure induced		(14)(59)(63) (86)(135) (141)(181)
									- el. field induced		(185)
									Raman spectra[u]		(20)(134) (167)
									Mol. beam magn. reson.[v]		

NO

State	T_e	ω_e		$\omega_e x_e$	B_e	α_e	D_e (10^{-6} cm^{-1})	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
$C\ ^2\Pi_r$ 3pπ	52126[a]	2395[b]		15[b]	2.000[bc]	0.030[b]		1.062	$C^c\to A$,[d]	8172	(45)(117)• (187)•
									$C^c\leftrightarrow X$,[e,f]	V 52251	(1)• (3)(4)•
									δ bands	52371	(6)(30)(42)• (90)(117)• (144)
$b\ (^4\Sigma^-)$	(48680)	1206[g]	H	15					$b\to a$,	V 10395 10375 10350 & 10323 10300 10272 M	(18)•(19)•
$B\ ^2\Pi_r$	45942.6[h]	1039.8[i]	Z	8.3$_2$[j]	1.152[i]	0.012			$B^m\leftrightarrow X$,[nf]	R 45392.1[o] Z	(1)•(2)•(6)•
	45913.6	1037.2[i]	Z	7.7$_0$[k]	1.092[it]	0.012	4.9	1.416$_7$	β bands	45481.7[o] Z	(3)(15)(18)• (24)(31)(37) (42)• (73)• (52)(90)(127)
$A\ ^2\Sigma^+$ 3sσ	43965.7	2374.31	Z	16.106[p]	1.9965[qrs]	0.01915[q]	5.4	1.0634	$A^t\leftrightarrow X$,[uvf]	V 44080.5	(1)• (3)(8)
									γ bands	44200.2[w] Z	(24)(37)(46) (127)
$a\ (^4\Pi_1)$	(38440)	1017	H	11					$(a\to X)^x$ M bands	(38000)	(48)(66)
$X\ ^2\Pi_r$	119.82[a]	1904.04$_0$	Z	14.100[b]	[1.72016][c]	0.0182	[10.2$_3$][c]	1.15077	$\frac{1}{2}\leftarrow\frac{1}{2}$,[e]	119.73[f] Z	(148)
	0	1904.20$_4$	Z	14.075[b]	[1.67195][cd]	0.0171	[0.5$_4$][c]		Rotation-vibration sp., 4→2		(63)

CO

State	T_e	ω_e		$\omega_e x_e$	B_e	α_e	D_e (10^{-6} cm^{-1})	r_e (Å)	Observed Transitions: Design.	Observed Transitions: ν_{00}	References
$D\ ^1\Delta$	65928	1094.0		10.20	1.257	0.017		1.399	$D\leftarrow X$,	R 65391[a]	(43)• (95) (109)
$I\ ^1\Sigma^-$	65084.4$_0$	1092.22	Z	10.70$_4$[b]	1.2705[c]	0.01848[d]	D_z = 9.0	1.3911	$I^e\leftarrow X$,	R 64546.2$_6$ Z	(39)• (95) (109)•
$A\ ^1\Pi$	65075.7$_7$	1518.2$_4$	Z	19.40[f]	1.6113[g]	0.0232$_5$[h]	7.33[i]	1.2353	$A^j\leftrightarrow X$,[kf]	R 64748.48[m] Z	(63)• (109)•
									4th positive gr.		
$e\ ^3\Sigma^-$	64230.2$_4$	1117.7$_2$	Z	10.686[n]	1.2836[o]	0.01753[p]	6.77[q]	1.3840	$e\to a$,[r] Herman b.	R 15231.6	(19)• (28)
									$e\leftarrow X$,	R 63704.8$_5$ Z	(23)• (96) (109)•
$d\ ^3\Delta_i$	61120.1[s]	1171.94	Z	10.635[t]	1.3108[u]	0.01782[v]	6.59[q]	1.3696	$d^w\to a$,[r] Triplet b.	R 12148.7	(13)(29)(72)
									$d\leftarrow X$,	R 60621.9[t] Z	(71)(109)•
$a'\ ^3\Sigma^+$	55825.4$_9$	1228.60	Z	10.468[x]	1.3446[y]	0.0189$_2$[z]	6.41[q]	1.3523	$a'^{\alpha}\to a$,[r] Asundi b.	R 6882.4	(1)(11)(14)
									$a'\leftarrow X$,[β] Hopfield-Birge b.	R 55355.6 Z	(23)• (96) (109)•
$a\ ^3\Pi_r$	48686.70[a]	1743.4$_1$		14.3$_6$[b]	1.69124[c]	0.01904[d]	6.36[e]	1.2057[4]	$a^f\leftrightarrow X$,[g] Cameron b.	R 48473.22[b]	(20)• (104) (109)•
$X\ ^1\Sigma^+$	0	2169.81358	Z	13.28831[h]	1.93128087[i]	0.01750441[j]	6.1214$_7$[k]	1.12832[l]	Rot.-vibr. sp.[mn],		
									1-0		(45)(48)(129)
									2-0[o]		(139)
									1-0[p]		(26)(41)
									Rotation sp.,		
									Far IR sp.[q]		(25)
									Microwave sp.		(24)(86)(1)•
									Mol. beam el. reson.[r]		(141)
									Mol. beam magn. reson.[s]		(46)(54)