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Halfwidths (self)

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Temperature-dependence of air-broadened halfwidth

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Pressure-shift (air)

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Halfwidths (air)

0. L.S. Rothman, R.R. Gamache, A. Goldman, L.R. Brown, R.A. Toth, H.M. Pickett, R.L. Poynter, J.-M. Flaud, C. Camy-Peyret, A. Barbe, N. Husson, C.P. Rinsland, and M.A.H. Smith, "The HITRAN database: 1986 Edition," *Appl.Opt.* **26,** 4058-4097 (1987).

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3. Third-oder polynomial fit of experimental results based on the three works: N. Lacome, A.

Levy, and G. Guelachvili, "Fourier transform measurement of self-, N_2-, and O_2-broadening of N_2O lines: temperature dependence of linewidths," *Appl.Opt.* **23,** 425-434 (1984); R.A. Toth, "N_2- and air-broadened linewidths and frequency-shifts of N_2O," *JQSRT* **66**, 285-304 (2000); and V. Nemtchinov, C. Sun, and P. Varanasi, "Measurements of Line Intensities and Line Widths in the ν_3-fundamental Band of Nitrous Oxide at Atmospheric Temperatures," *JQSRT* **83,** 267-284 (2004).

Halfwidths (self)

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Temperature-dependence of air-broadened halfwidth

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Pressure-shift (air)

1. R.A. Toth, "Linelist of N_2O parameters from 500 to 7500 cm^{-1}," to be published (2004).

CO 26, 36, 28, 27, 38, 37

Positions

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Halfwidths (air)

1. T. Nakazawa and M. Tanaka, "Measurements of Intensities and Self- and Foreign gas broadened halfwidths of spectral Lines in the CO fundamental Band," *JQSRT* **28,** 409-416 (1982); values for transitions having $20< |m| \leq 33$ are extrapolated, while those for $|m| > 34$ are assumed to be constant (0.0400 cm^{-1}/atm).

2. Polynomial fit of several measurements (M.A.H. Smith, private communication, 2004). For details, see L.S. Rothman, D. Jacquemart, A. Barbe, D.C. Benner, J.W. Brault, J.-P. Bouanich, L.R. Brown, Jr.C. Chackerian, C. Camy-Peyret, M.R. Carleer, V. Dana, V.M. Devi, A. Fayt, J.-M. Flaud, R.R. Gamache, A. Goldman, K.W. Jucks, A.G. Maki, J.-Y. Mandin, M.-F. Mérienne, C.E. Miller, A. Perrin, H.M. Pickett, C.P. Rinsland, M.A.H. Smith, B. Sumpf, Tashkun Sa, R.A. Toth, J. Vander Auwera, and P. Varanasi, "The HITRAN 2004 Molecular Spectroscopic Database," *JQSRT* in preparation.

Halfwidths (self)

1. T. Nakazawa and M. Tanaka, "Measurements of Intensities and Self- and Foreign gas broadened halfwidths of spectral Lines in the CO fundamental Band," *JQSRT* **28,** 409-416 (1982); values for transitions having $20< |m| \leq 33$ are extrapolated, while those for $|m| > 34$ are assumed to be constant (0.0460 cm^{-1}/atm).

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Temperature-dependence of air-broadened halfwidth

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Pressure-shift (air)

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CH_4 211, 311, 212

Positions

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9. L.R. Brown, "Methane line parameters from 3700 to 4136 cm^{-1}," *Appl.Opt.* **27,** 3275-3279 (1988).

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Halfwidths (air)

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Halfwidths (self)

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Temperature-dependence of air-broadened halfwidth

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J.C. Hilico, B. Lavorel, M. Loëte, G.C. Mellau, A. Nikitin, A.S. Pine, A. Predoi-Cross, C.P. Rinsland, O. Robert, R.L. Sams, M.A.H. Smith, S.A. Tashkun, and V.G. Tyuterev," "Methane Line Parameters in HITRAN,". *JQSRT* **83,** 219-238 (2003).
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15. Intensities have been rescaled by multiply by a factor of 1.067 Ref. 7

16. Intensities have been rescaled by multiply by a factor of 1.067 Ref. 8

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ClO 56, 76

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H_2O_2 1661

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Halfwidths (air)

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6. Average values of Refs 2-5.

Halfwidths (self)

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of H_2S," *J.Mol.Spectrosc.* **165,** 150-158 (1994).
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Pressure-shift (air)

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HCOOH 126

Positions

1. A. Goldman, F.H. Murcray, D.G. Murcray, and C.P. Rinsland, "A Search for Formic Acid in the Upper Troposphere: A Tentative Identification of the 1105 cm^{-1} ν_6 band Q branch in High Resolution Balloon-borne Absorption Spectra," *Geophys.Res.Let.* **11,** 307-310 (1984); A. Goldman and J.R. Gillis, "Line Parameters and Line-by-line Calculations for Molecules of Stratospheric Interest," Progress Report, Dept. of Physics, Univ. Denver (1984).

2. A. Perrin, C.P. Rinsland, and A. Goldman, "Spectral parameters for the ν_6 region of HCOOH and its measurement in the infrared tropospheric spectrum," *J.Geophys.Res.* **104,** 18,661-18,666 (1999).

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Halfwidths (air)

1. A. Goldman and J.R. Gillis, "Line Parameters and Line-by-line Calculations for Molecules of Stratospheric Interest," Progress Report, Dept. of Physics, Univ. Denver (1984).

Halfwidths (self)

1. A. Perrin, C.P. Rinsland, and A. Goldman, "Spectral parameters for the ν_6 region of HCOOH and its measurement in the infrared tropospheric spectrum," *J.Geophys.Res.* **104,** 18,661-18,666 (1999).

Temperature-dependence of air-broadened halfwidth

1. A. Goldman, private communication (1996).

HO_2 166

Positions

1. C. Yamada, Y. Endo, and E. Hirota, "Difference frequency laser spectroscopy of the ν_1 band of the HO_2 radical," *J.Chem.Phys.* **78,** 4379-4384 (1983).
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O 6

Positions

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1. H.M. Pickett, R.L. Poynter, E.A. Cohen, M.L. Delitsky, J.C. Pearson, and H.S.P. Müller, "Submillimeter, Millimeter, and Microwave Spectral Line Catalog," JPL Publication 800-23, rev. 4 (1996).

Halfwidths (air)

1. Does not have the standard HITRAN definition of Lorentz air broadening, but a default value of 0.05 cm^{-1}/atm was appended.

$ClONO_2$ 5646, 7646

Positions

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Intensities

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Halfwidths (air)

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NO^+ 46

Positions

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1. H.-J. Werner and P. Rosmus, "Ab Initio Calculations of Radiative Transition Probabilities in the $X^1\Sigma^+$ Ground State of the NO^+ Ion," *J.Mol.Spectrosc.* **96,** 362-367 (1982).

Halfwidths (air)

1. Default value of 0.06 cm^{-1}/atm chosen, but applications are most likely not required to work in Lorentzian regime.

HOBr 169, 161

Positions

1. E.A. Cohen, G.A. McRae, T.L. Tan, R.R. Friedl, J.W.C. Johns, and N. Noël, "The ν_1 Band of HOBr," *J.Mol.Spectrosc.* **173,** 55-61 (1995).

Intensities

1. Y. Koga, H. Takeo, S. Kondo, M. Sugie, C. Matsumura, G.A. Rae, and E.A. Cohen, "The Rotational Spectra, Molecular Structure, Dipole Moment, and Hyperfine Constants of HOBr and DOBr," *J.Mol.Spectrosc.* **138**, 467-481 (1989).

Halfwidths (air)

1. A constant value of 0.06 cm^{-1}/atm has been assumed for the air-broadened halfwidth with a temperature-dependence coefficient $n = 0.67$.

C_2H_4 221, 231

Positions

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Halfwidths (air)

1. J.F. Brannon, Jr. and P. Varanasi, A Tunable Diode Laser Measurements on the 951.7393 cm^{-1} Line of $^{12}C_2H_4$ at Planetary Atmospheric Temperatures," *JQSRT* **47,** 237-242 (1992).

Halfwidths (self)

Temperature-dependence of air-broadened halfwidth

1. J.F. Brannon, Jr. and P. Varanasi, A Tunable Diode Laser Measurements on the 951.7393 cm^{-1} Line of $^{12}C_2H_4$ at Planetary Atmospheric Temperatures," *JQSRT* **47,** 237-242 (1992).

CH_3OH 2161

Positions

1. L.H. Xu, R.M. Lees, P. Wang, L.R. Brown, I. Kleiner, J.W.C. Johns, "New assignments, line intensities and HITRAN database for CH_3OH at 10 μm," *J.Mol.Spectrosc.* (in press).
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Intensities

1. L.H. Xu, R.M. Lees, P. Wang, L.R. Brown, I. Kleiner, J.W.C. Johns, "New assignments, line intensities and HITRAN database for CH_3OH at 10 μm," *J.Mol.Spectrosc.* (in press).
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Halfwidths (air)

1. L.H. Xu, R.M. Lees, P. Wang, L.R. Brown, I. Kleiner, J.W.C. Johns, "New assignments, line intensities and HITRAN database for CH_3OH at 10 μm," *J.Mol.Spectrosc.* (in press).

Halfwidths (self)

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Temperature-dependence of air-broadened halfwidth

1. L.H. Xu, R.M. Lees, P. Wang, L.R. Brown, I. Kleiner, J.W.C. Johns, "New assignments, line intensities and HITRAN database for CH_3OH at 10 μm," *J.Mol.Spectrosc.* (in press).

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Isotopic Abundances Used for HITRAN

[based on P. De Bievre, M. Gallet, N.E. Holden, and I.L. Barnes, "Isotopic Abundances and Atomic Weights of the Elements," *J.Phys.Chem.Ref.Data* **13,** 809-891 (1984)]

Molecule	Isotopologue	Abundance	Molecule	Isotopologue	Abundance
H_2O (1)	161	0.997317	**CO** (5)	26	0.98654
	181	0.00199983		36	0.01108
	171	0.000372		28	0.0019782
	162	0.00031069		27	0.000368
	182	0.000000623		38	0.00002222
	172	0.000000116		37	0.00000413
CO_2 (2)	626	0.98420	**CH_4** (6)	211	0.98827
	636	0.01106		311	0.01110
	628	0.0039471		212	0.00061575
	627	0.000734	**O_2** (7)	66	0.995262
	638	0.00004434		68	0.00399141
	637	0.00000825		67	0.000742
	828	0.0000039573	**NO** (8)	46	0.993974
	728	0.00000147		56	0.0036543
O_3 (3)	666	0.992901		48	0.00199312
	668	0.00398194	**SO_2** (9)	626	0.94568
	686	0.00199097		646	0.04195
	667	0.000740	**NO_2** (10)	646	0.991616
	676	0.000370	**NH_3** (11)	4111	0.9958715
N_2O (4)	446	0.990333		5111	0.0036613
	456	0.0036409	**HNO_3** (12)	146	0.989110
	546	0.0036409	**OH** (13)	61	0.997473
	448	0.00198582		81	0.00200014
	447	0.000369		62	0.00015537

Molecule	Isotopologue	Abundance	Molecule	Isotopologue	Abundance
HF (14)	19	0.99984425	**CH_3Cl** (24)	215	0.74894
HCl (15)	15	0.757587		217	0.23949
	17	0.242257	**H_2O_2** (25)	1661	0.994952
HBr (16)	19	0.50678	**C_2H_2** (26)	1221	0.97760
	11	0.49306		1231	0.02197
HI (17)	17	0.99984425	**C_2H_6** (27)	1221	0.97699
ClO (18)	56	0.75591	**PH_3** (28)	1111	0.99953283
	76	0.24172	**COF_2** (29)	269	0.98654
OCS (19)	622	0.93739	**SF_6** (30)	29	0.95018
	624	0.04158	**H_2S** (31)	121	0.94988
	632	0.01053		141	0.04214
	623	0.007399		131	0.007498
	822	0.001880	**HCOOH** (32)	126	0.983898
H_2CO (20)	126	0.98624	**HO_2** (33)	166	0.995107
	136	0.01108	**O** (34)	6	0.997628
	128	0.0019776	**$ClONO_2$** (35)	5646	0.74957
HOCl (21)	165	0.75579		7646	0.23970
	167	0.24168	**NO^+** (36)	46	0.993974
N_2 (22)	44	0.9926874	**HOBr** (37)	169	0.5056
HCN (23)	124	0.98511		161	0.4919
	134	0.01107	**C_2H_4** (38)	221	0.9773
	125	0.0036217		231	0.02196
			CH_3OH (39)	2161	0.98593

Uncertainty Codes used in HITRAN Database

Line position and Pressure shift (cm^{-1})		Intensity, Halfwidths, and Temperature-dependence	
Code	**Uncertainty Range**	**Code**	**Uncertainty Range**
0	≥1. or Unreported	0	Unreported or Unavailable
1	≥0.1 and <1.	1	Default or Constant
2	≥0.01 and <0.1	2	Average or Estimate
3	≥0.001 and <0.01	3	≥ 20%
4	≥0.0001 and <0.001	4	≥ 10% and < 20%
5	≥0.00001 and <0.0001	5	≥ 5% and < 10%
6	<0.00001	6	≥ 2% and < 5%
		7	≥ 1% and < 2%
		8	< 1%