

**** Collision Induced Absorption (CIA) references ****

**These numbers can be found in the data headers of the HITRAN CIA files,
see readme file for details**

- [1] K.M. Smith, D.A. Newnham, Near-infrared absorption cross sections and integrated absorption intensities of molecular oxygen (O_2 , O_2-O_2 , and O_2-N_2), *J. Geophys. Res. Atmos.* 105 (2000) 7383–7396. doi:[10.1029/1999JD901171](https://doi.org/10.1029/1999JD901171).
- [2] Y.I. Baranov, W.J. Lafferty, G.T. Fraser, Investigation of collision-induced absorption in the vibrational fundamental bands of O_2 and N_2 at elevated temperatures, *J. Mol. Spectrosc.* 233 (2005) 160–163. doi:[10.1016/j.jms.2005.06.008](https://doi.org/10.1016/j.jms.2005.06.008).
- [3] W.J. Lafferty, A.M. Solodov, A. Weber, W.B. Olson, J.-M. Hartmann, Infrared collision-induced absorption by N_2 near 4.3 μm for atmospheric applications: measurements and empirical modeling, *Appl. Opt.* 35 (1996) 5911. doi:[10.1364/AO.35.005911](https://doi.org/10.1364/AO.35.005911).
- [4] H. Tran, C. Boulet, J.-M. Hartmann, Line mixing and collision-induced absorption by oxygen in the A band: Laboratory measurements, model, and tools for atmospheric spectra computations, *J. Geophys. Res.* 111 (2006) D15210. doi:[10.1029/2005JD006869](https://doi.org/10.1029/2005JD006869).
- [5] M. Vangvichith, H. Tran, J.-M. Hartmann, Line-mixing and collision induced absorption for O_2-CO_2 mixtures in the oxygen A-band region, *J. Quant. Spectrosc. Radiat. Transf.* 110 (2009) 2212–2216. doi:[10.1016/J.QSRT.2009.06.002](https://doi.org/10.1016/J.QSRT.2009.06.002).
- [6] M. Abel, L. Frommhold, X. Li, K.L.C. Hunt, Infrared absorption by collisional H_2-He complexes at temperatures up to 9000 K and frequencies from 0 to 20 000 cm^{-1} , *J. Chem. Phys.* 136 (2012) 044319. doi:[10.1063/1.3676405](https://doi.org/10.1063/1.3676405).
- [7] M. Abel, L. Frommhold, X. Li, K.L.C. Hunt, Collision-Induced Absorption by H_2 Pairs: From Hundreds to Thousands of Kelvin, *J. Phys. Chem. A.* 115 (2011) 6805–6812. doi:[10.1021/jp109441f](https://doi.org/10.1021/jp109441f).
- [8] G.D. Greenblatt, J.J. Orlando, J.B. Burkholder, A.R. Ravishankara, Absorption measurements of oxygen between 330 and 1140 nm, *J. Geophys. Res.* 95 (1990) 18577. doi:[10.1029/JD095iD11p18577](https://doi.org/10.1029/JD095iD11p18577).
- [9] C. Hermans, Measurement of absorption cross sections and spectroscopic molecular parameters, (2011). <http://spectrolab.aeronomie.be/o2.htm>.
- [10] B. Maté, C. Lugez, G.T. Fraser, W.J. Lafferty, Absolute intensities for the O_2 1.27 μm continuum absorption, *J. Geophys. Res. Atmos.* 104 (1999) 30585–30590. doi:[10.1029/1999JD900824](https://doi.org/10.1029/1999JD900824).
- [11] A. Borysow, L. Frommhold, Collision-induced rototranslational absorption spectra of N_2-N_2 pairs for temperatures from 50 to 300 K, *Astrophys. J.* 311 (1986) 1043. doi:[10.1086/164841](https://doi.org/10.1086/164841).
- [12] A. Borysow, L. Frommhold, Theoretical collision-induced rototranslational absorption spectra for modeling Titan's atmosphere - H_2-N_2 pairs, *Astrophys. J.* 303 (1986) 495. doi:[10.1086/164096](https://doi.org/10.1086/164096).
- [13] A. Borysow, C. Tang, Far Infrared CIA Spectra of N_2-CH_4 Pairs for Modeling of Titan's Atmosphere, *Icarus.* 105 (1993) 175–183. doi:[10.1006/icar.1993.1117](https://doi.org/10.1006/icar.1993.1117).

- [14] J. Borysow, L. Frommhold, G. Birnbaum, Collision-induced rototranslational absorption spectra of H₂-He pairs at temperatures from 40 to 3000 K, *Astrophys. J.* 326 (1988) 509. doi:[10.1086/166112](https://doi.org/10.1086/166112).
- [15] G. Orton, M. Gustafsson, M. Burgdorf, V. Meadows, Revised ab initio models for H₂-H₂ collision-induced absorption at low temperatures, *Icarus*. 189 (2007) 544–549. doi:[10.1016/j.icarus.2007.02.003](https://doi.org/10.1016/j.icarus.2007.02.003).
- [16] A. Borysow, L. Frommhold, Theoretical collision-induced rototranslational absorption spectra for the outer planets - H₂-CH₄ pairs, *Astrophys. J.* 304 (1986) 849. doi:[10.1086/164221](https://doi.org/10.1086/164221).
- [17] M. Gustafsson, L. Frommhold, The H₂-H infrared absorption bands at temperatures from 1000 K to 2500 K, *Astron. Astrophys.* 400 (2003) 1161–1162. doi:[10.1051/0004-6361:20030100](https://doi.org/10.1051/0004-6361:20030100).
- [18] M. Gustafsson, L. Frommhold, Infrared Absorption Spectra of Collisionally Interacting He and H Atoms, *Astrophys. J.* 546 (2001) 1168–1170. doi:[10.1086/318311](https://doi.org/10.1086/318311).
- [19] A. Borysow, L. Frommhold, Collision-induced rototranslational absorption spectra of CH₄-CH₄ pairs at temperatures from 50 to 300 K, *Astrophys. J.* 318 (1987) 940. doi:[10.1086/165426](https://doi.org/10.1086/165426).
- [20] M. Gruszka, A. Borysow, Roto-Translational Collision-Induced Absorption of CO₂ for the Atmosphere of Venus at Frequencies from 0 to 250 cm⁻¹, at Temperatures from 200 to 800 K, *Icarus*. 129 (1997) 172–177. doi:[10.1006/icar.1997.5773](https://doi.org/10.1006/icar.1997.5773).
- [21] R.E. Samuelson, N.R. Nath, A. Borysow, Gaseous abundances and methane supersaturation in Titan's troposphere, *Planet. Space Sci.* 45 (1997) 959–980. doi:[10.1016/S0032-0633\(97\)00090-1](https://doi.org/10.1016/S0032-0633(97)00090-1).
- [22] B.J. Drouin, D.C. Benner, L.R. Brown, M.J. Cich, T.J. Crawford, V.M. Devi, A. Guillaume, J.T. Hodges, E.J. Mlawer, D.J. Robichaud, F. Oyafuso, V.H. Payne, K. Sung, E.H. Wishnow, S. Yu, Multispectrum analysis of the oxygen A-band, *J. Quant. Spectrosc. Radiat. Transf.* 186 (2017) 118–138. doi:[10.1016/j.jqsrt.2016.03.037](https://doi.org/10.1016/j.jqsrt.2016.03.037).
- [23] Y.I. Baranov, W.J. Lafferty, G.T. Fraser, Infrared spectrum of the continuum and dimer absorption in the vicinity of the O₂ vibrational fundamental in O₂/CO₂ mixtures, *J. Mol. Spectrosc.* 228 (2004) 432–440. doi:[10.1016/j.jms.2004.04.010](https://doi.org/10.1016/j.jms.2004.04.010).
- [24] J.M. Hartmann, C. Boulet, G.C. Toon, Collision-induced absorption by N₂ near 2.16 μm: Calculations, model, and consequences for atmospheric remote sensing, *J. Geophys. Res.* 122 (2017) 2419–2428. doi:[10.1002/2016JD025677](https://doi.org/10.1002/2016JD025677).
- [25] R.H. Taylor, A. Borysow, L. Frommhold, Concerning the rototranslational absorption spectra of He-CH₄ pairs, *J. Mol. Spectrosc.* 129 (1988) 45–58. doi:[10.1016/0022-2852\(88\)90257-3](https://doi.org/10.1016/0022-2852(88)90257-3).
- [26] E. Bar-Ziv, S. Weiss, Translational Spectra Due to Collision-Induced Overlap Moments in Mixtures of He with CO₂, N₂, CH₄, and C₂H₆, *J. Chem. Phys.* 57 (1972) 34–37. doi:[10.1063/1.1677970](https://doi.org/10.1063/1.1677970).
- [27] T. Karman, M.A.J. Koenis, A. Banerjee, D.H. Parker, I.E. Gordon, A. Van Der Avoird, W.J. Van Der Zande, G.C. Groenenboom, O₂-O₂ and O₂-N₂ collision-induced absorption mechanisms unravelled, *Nat. Chem.* (2018) 1–6. doi:[10.1038/s41557-018-0015-x](https://doi.org/10.1038/s41557-018-0015-x).

- [28] R. Wordsworth, Y. Kalugina, S. Lokshantov, A. Vigasin, B. Ehlmann, J. Head, C. Sanders, H. Wang, Transient reducing greenhouse warming on early Mars, *Geophys. Res. Lett.* 44 (2017) 665–671. doi:[10.1002/2016GL071766](https://doi.org/10.1002/2016GL071766).
- [29] F.R. Spiering, W.J. van der Zande, Collision induced absorption in the $a^1\Delta(v=2) \leftarrow X^1\Sigma_g^-(v=0)$ band of molecular oxygen, *Phys. Chem. Chem. Phys.* 14 (2012) 9923. doi:[10.1039/c2cp40961e](https://doi.org/10.1039/c2cp40961e).
- [30] F.R. Spiering, M.B. Kiseleva, N.N. Filippov, H. Naus, B. van Lieshout, C. Weijenborg, W.J. van der Zande, Line mixing and collision induced absorption in the oxygen A-band using cavity ring-down spectroscopy., *J. Chem. Phys.* 133 (2010) 114305. doi:[10.1063/1.3460924](https://doi.org/10.1063/1.3460924).
- [31] T. Karman, E. Miliordos, K.L.C. Hunt, G.C. Groenenboom, A. van der Avoird, Quantum mechanical calculation of the collision-induced absorption spectra of N_2-N_2 with anisotropic interactions, *J. Chem. Phys.* 142 (2015) 084306. doi:[10.1063/1.4907917](https://doi.org/10.1063/1.4907917).
- [32] R. Thalman, R. Volkamer, Temperature dependent absorption cross-sections of O_2-O_2 collision pairs between 340 and 630 nm and at atmospherically relevant pressure, *Phys. Chem. Chem. Phys.* 15 (2013) 15371. doi:[10.1039/c3cp50968k](https://doi.org/10.1039/c3cp50968k).
- [33] Estimated from N_2-N_2 data from Refs. [2,3] using Eq. (7) of Ref. [3], which is derived using data from V. Menoux, R.L. Doucen, C. Boulet, A. Roblin, A.M. Bouchardy, Collision-induced absorption in the fundamental band of N_2 : temperature dependence of the absorption for N_2-N_2 and N_2-O_2 pairs., *Appl. Opt.* 32 (1993) 263–268. doi:[10.1364/AO.32.000263](https://doi.org/10.1364/AO.32.000263).
- [34] L.N. Fletcher, M. Gustafsson, G.S. Orton, Hydrogen Dimers in Giant-planet Infrared Spectra, *Astrophys. J. Suppl. Ser.* 235 (2018) 24. doi:[10.3847/1538-4365/aaa07a](https://doi.org/10.3847/1538-4365/aaa07a).
- [35] J.-M. Hartmann, C. Boulet, D.D. Tran, H. Tran, Y. Baranov, Effect of humidity on the absorption continua of CO_2 and N_2 near $4 \mu m$: Calculations, comparisons with measurements, and consequences for atmospheric spectra, *J. Chem. Phys.* 148 (2018) 054304. doi:[10.1063/1.5019994](https://doi.org/10.1063/1.5019994).
- [36] E.H. Wishnow, K. Sung, The far-infrared collision-induced spectrum of nitrogen over the temperature range 78-129 K, *J. Quant. Spectrosc. Radiat. Transf.* in prepara (2018).
- [37] Y.I. Baranov, A.A. Vigasin, Collision-Induced Absorption by CO_2 in the Region of $\nu_1, 2\nu_2$, *J. Mol. Spectrosc.* 193 (1999) 319–325. doi:[10.1006/JMSP.1998.7743](https://doi.org/10.1006/JMSP.1998.7743).
- [38] Y.I. Baranov, G.T. Fraser, W.J. Lafferty, A.A. Vigasin, Collision-Induced Absorption in The CO_2 Fermi Triad for Temperatures from 211K to 296 K, in: *Weakly Interact. Mol. Pairs Unconv. Absorbers Radiat. Atmos.*, Springer Netherlands, Dordrecht, 2003: pp. 149–158. doi:[10.1007/978-94-010-0025-3_12](https://doi.org/10.1007/978-94-010-0025-3_12).
- [39] Y.I. Baranov, Collision-induced absorption in the region of the $\nu_2 + \nu_3$ band of carbon dioxide, *J. Mol. Spectrosc.* 345 (2018) 11–16. doi:[10.1016/J.JMS.2017.11.005](https://doi.org/10.1016/J.JMS.2017.11.005).
- [40] D. N. Chistikov, A. A. Finenko, S. E. Lokshantov, S. V. Petrov, A. A. Vigasin. Simulation of collision-induced spectra based on classical trajectories and ab initio and induced dipole surfaces. I. Case study of N_2-N_2 rototranslational band, *J. Chem. Phys.* 151 (2019) 194106. doi:[10.1063/1.5125756](https://doi.org/10.1063/1.5125756).

- [41] T. A. Odintsova, E. A. Serov, A. A. Balashov, M. A. Koshelev, A. O. Koroleva, A. A. Simonova, M. Y. Tretyakov, N. N. Filippov, D. N. Chistikov, A. A. Finenko, S. E. Lokshtanov, S. V. Petrov, A. A. Vigasin, CO₂-CO₂ and CO₂-Ar continua at millimeter wavelengths, *J. Quant. Spectrosc. Radiat. Transf.* 258 (2021) 107400. doi: [10.1016/j.jqsrt.2020.107400](https://doi.org/10.1016/j.jqsrt.2020.107400).
- [42] F. Thibault, V. Menoux, R. Le Doucen, L. Rosenmann, J.-M. Hartmann, C. Boulet, Infrared collision-induced absorption by O₂ near 6.4 μm for atmospheric applications: measurements and empirical modeling, *Appl. Opt.* 36 (1997) 563-567. doi: [10.1364/AO.36.000563](https://doi.org/10.1364/AO.36.000563).
- [43] J. Orlando, G. Tyndall, K. Nickerson, J. Calvert, The temperature dependence of collision-induced absorption by oxygen near 6 μm, *J. Geophys. Res. Atmos.* 96 (1991) 20755-20760. doi: [10.1029/91JD02042](https://doi.org/10.1029/91JD02042).