ABSOLUTE INTENSITIES FOR THE O_2 1.27 μm CONTINUUM ABSORPTION

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Collision-induced absorption coefficients for the 1.27 μm band of O_2 have been measured at a resolution of 0.5 cm^{-1} and an optical pathlength of L = 84 m using a Fourier-transform spectrometer and 2-m long White-type multipass absorption cell. Spectra were recorded for sample densities, ρ, from 1 to 10 times that of a ideal gas under standard conditions (T = 273.15 K and P = 101.325 kPa), i.e., 1 to 10 amagats, at temperatures of 253 K, 273 K, and 296 K, for pure O_2 and O_2/N_2 mixtures. After removing the contributions from the sharp lines of the $v = 0 \leftarrow 0$ component of the O_2 $a^1\Delta_g \leftarrow X^3\Sigma_g^-$ band, which overlaps the continuum band, the integrated band strength per unit pathlength, $S \equiv S_{O_2-O_2}\ {\rho_{O_2}}^2 + S_{O_2-N_2}\ \rho_{N_2}\ \rho_{O_2}$, has been determined for several values of the densities, ρ_{O_2} and ρ_{N_2}, to give values for $S_{O_2-O_2}$ and $S_{O_2-N_2}$. At 296 K we find $S_{O_2-O_2}$ = $4.847(22) \times 10^{-43}$ cm^{-2} (molecule/cm^3)$^{-2}$ [$3.499(16) \times 10^{-4}$ cm^{-2} $amagat^{-2}$] and $S_{O_2-N_2} = 0.941(50) \times 10^{-43}$ cm^{-2} (molecule/cm^3)$^{-2}$ [$0.679(36) \times 10^{-4}$ cm^{-2} $amagat^{-2}$]. Here and elsewhere, Type A expanded uncertainties are given with a coverage factor k = 2. The $S_{O_2-O_2}$ coefficient is in reasonable agreement with the previous measurements of Cho et al. [C.W. Cho, E.J. Allin, and H.L. Welsh, *Can.J.Phys.* **41**, 1991-2002 (1963)], however our value of $S_{O_2-N_2}$ is a factor of 2.6 times greater than their results. The derived air coefficient, S_{O_2-air}, is 37 % greater than the value determined by Mlawer et al. [E.J. Mlawer, S.A. Clough, P.D. Brown, T.M. Stephen, J.C. Landry, A. Goldman, and F.J. Murcray, *J.Geophys.Res.* **103**, 3859-3863 (1998)] from an atmospheric measurement, which has been corrected for the most recent value for the absorption coefficients for the overlapping O_2 $a^1\Delta_g \leftarrow X^3\Sigma_g^-$ band. The binary collision coefficients are available as a function of frequency for use in atmospheric modeling.