LINE INTENSITIES MEASUREMENTS OF CARBONYL SULFIDE ($^{16}O^{12}C^{32}S$) IN THE $4\nu_2$ and $\nu_2+\nu_3-\nu_2$ BANDS

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To support atmospherically studies of the Earth's troposphere and the Venus atmosphere, we measured line strengths of the P and R branches of the $4\nu_2$ third overtone of the ν_2 mode, and the P, R and Q branches of the $\nu_2+\nu_3-\nu_2$ hot band, of the primary isotopologue of carbonyl sulfide ($^{16}O^{12}C^{32}S$), whose band centers are located at 2104.83 and 2054.89 cm^{-1}, respectively. For this, infrared absorption spectra in normal carbonyl sulfide (OCS) sample gas were recorded at unapodized resolution of 0.003 cm^{-1} at room temperatures in deferent pressures between 0.01 and 0.0618 Torr using a Bruker Fourier transform spectrometer (FTS) at the LISA Laboratory in France. The line strengths were obtained using the method of multi-spectrum fitting to the measured shapes of the lines, including the interference effects caused by the line overlaps.

For the two bands, the vibrational transition dipole moment squared, as well as Herman–Wallis coefficients have been determined. The results of line intensities are compared to the earlier measurements[1,2] and the HITRAN 2008 database.

An examination of these line strengths and these vibrational transition dipole moment shows a pronounced m ($m=-J$ for $P(J)$ lines, $m = J+1$ for $R(J)$ lines and $m=J$ for $Q(J)$ lines) quantum number dependencies.

1. L. Régalia-Jarlot, A.Hamdouni, X.Thomas, P.Von der Heyden and A.Barbe J. Quant. Spectrosc. Radiat. Transfer **74** (2002) 455– 470

2. J. Vander Auwera and A. Fayt J. Mol. Struct. **780** (2006) 134–141