PRESSURE BROADENING IN THE $^{13}C^{16}O$ 2–0 BAND

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N_2 induced pressure broadening in the $^{13}C^{16}O$ 2–0 band around 4167 cm^{-1} was investigated using Fourier Transform Spectroscopy. The spectra were recorded with a sample of 99 % isotopically pure ^{13}CO in a White-type absorption cell at a resolution of 0.005 cm^{-1}. Voigt profiles convolved with the FTS apparatus function were fitted to the observed lineshapes[a], and Lorentzian HWHM were determined as function of N_2 pressure. Pressure broadening coefficients for *m* between –33 and +34 were obtained with uncertainties of 5.8 %.[b]. The results are compared to N_2 broadening coefficients obtained from simultaneous measurements in the 2–0 band of $^{12}C^{16}O$. While the latter values agree well with those published earlier, those of $^{13}C^{16}O$ are systematically lower by 5–7 % compared to $^{12}C^{16}O$. This indicates that in spectroscopic databases the pressure broadening of $^{13}C^{16}O$ is significantly overestimated. This is most important since recent work[c] shows that the $^{13}CO/^{12}CO$ mixing ratio is an indicator of stratospheric O_3 depletion chemistry.

[a] K. Chance, Smithsonian Center for Astrophysics, Cambridge, USA, personal communication (1995).
[b] S. Voigt et al., J. Mol. Spectrosc. 180, 359 (1996).
[c] C. A. Brenninkmeijer et al., Geophys. Res. Lett. 23 (16), 2125 (1996).