AIR-BROADENING PARAMETERS IN THE ν_3 BAND OF $^{14}N^{16}O_2$ USING A MULTISPECTRUM FITTING TECHNIQUE

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Air-broadened line widths, pressure-induced shift coefficients and their temperature dependences were retrieved for over 700 transitions in the ν_3 band of $^{14}N^{16}O_2$ at 6 μm. In addition, precise line center positions and relative intensities were also determined. The results were obtained by fitting simultaneously 27 spectra recorded at high resolution (0.002 cm^{-1} to 0.006 cm^{-1}) with two different Fourier transform spectrometers and gas sample temperatures ranging from 206 K to 298 K.

It was necessary to modify the multispectrum fitting software[a] to accommodate constraints on the retrieved parameters of closely-spaced spin-split doublets in order to successfully determine broadening and shift parameters for the components of these doublets. The variations of the line broadening and shift parameters with the quantum numbers were investigated. Subsets of the observed line widths were reproduced to within 3% using an empirical smoothing function.[b]

[a] D. Chris Benner, C. P. Rinsland, V. Malathy Devi, M. A. H. Smith and D. Atkins, *JQSRT* **53**, 705-721 (1995).

[b] The research at Jet Propulsion Laboratory, California Institute of Technology and the College of William and Mary was carried out under contracts and cooperative agreements with the National Aeronautics and Space Administration.