BROADENING, SHIFTS AND LINE MIXING IN THE $^{13}CH_4$ ν_4 BAND

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We have reanalyzed our air-broadened spectra of the ν_4 band of $^{13}CH_4$ by employing a multispectrum nonlinear least squares fitting procedure.[a] To fit the highest pressure spectrum well, it was sometimes necessary to invoke line mixing. In these cases the off-diagonal relaxation matrix elements were determined directly from the fits. The data contained four room temperature $^{13}CH_4$ spectra together with up to sixty $^{12}CH_4$ spectra including both self- and air broadening taken at different pressures and temperatures. The four $^{13}CH_4$ spectra included one low-pressure spectrum of a 99 percent ^{13}C-enriched CH_4 in a 0.0985-cm Pyrex absorption cell and three spectra with $\sim$0.5 percent volume mixing ratio of $^{13}CH_4$ in air contained in a 50-cm cell also made of Pyrex. Air-broadened halfwidth and air-induced pressure shift coefficients were measured for nearly 200 transitions of the $^{13}CH_4$ ν_4 band with J" as large as 16. Line mixing coefficients were retrieved where appropriate. A comparison of present results with previous measurements will be made.
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[a] D. Chris Benner et al., *JQSRT* **53**, 705-721 (1995).