PRESSURE BROADENING, PRESSURE SHIFTS AND ABSOLUTE LINE INTENSITIES MEASUREMENTS IN THE $\nu_1 + 3\nu_3$ BAND OF $^{12}C_2H_2$

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We have used a Ti:Sa autoscan laser spectrometer to perform a detailed investigation of individual line profiles in the $\nu_1 + 3\nu_3$ band of $^{12}C_2H_2$, near 12676 cm^{-1}. Pressure self- and Ar-induced broadening, narrowing and shift effects, as well as absolute intensities, were measured for lines with $J'' = 0$ to 23, at room temperature and total pressures in the range from 10 to 800 mbar using a long White-type multiple-pass absorption cell. For the pressure shift measurements, an optoacoustic cell with a constant, low acetylene pressure provided simultaneous reference line position wavenumbers. The high-pressure spectra ($p > 330$ mbar) were fitted satisfactorily by a Voigt profile. Line narrowing, characterized by an underestimation of the Lorentz contribution to the Voigt profile, was observed for the low pressures range ($p < 200$ mbar), indicating the influence of molecular confinement. The two usual limit models (soft and hard collisions) were fitted to the observed line shapes to extract more precise information concerning the pressure broadening. Self- and Ar-induced lineshift parameters significantly different from the overall behavior in the band are unexpectedly observed for the $R(17)$ and $P(19)$ lines. This result is explained in terms of a different *inter*molecular behavior of the molecule in the upper $J = 18$ rotational level, attributed to an *intra*molecular Coriolis-type coupling with a nearby state tentatively assigned as containing important excitation in ν_5, the *cis*-bending mode.