FTIR MEASUREMENTS OF N_2-INDUCED PRESSURE BROADENING OF ALLENE(C_3H_4) IN THE ν_{10} BAND NEAR 840 cm^{-1}

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Pressure broadening coefficients have been measured in the 841 cm^{-1} ν_{10} band of allene perturbed by nitrogen. The high-resolution absorption infrared spectra were recorded by a FTIR spectrometer at temperatures of 200, 250 and 300 K. The Voigt line shape, convoluted with the sinc instrument function, was used in the fit of the observed rovibrational lines. No regular J and K dependence of the broadening coefficients was observed for this strong symmetric-top-molecule band. The power-exponential-gap (PEG) fitting law and infinite-order-sudden (IOS) scaling law were effectively modified and employed for the fit of measured broadening coefficients. A selection rule of $|\Delta m| = 0$ was found to be necessary to optimize the simulation. For the modified IOS, the Coriolis resonance of ν_{10} with the nearby ν_9 has been taken into account. For the 200 K spectrum, more than 180 broadening coefficients for transitions up to $J'' = 40$ and $K'' = 8$ were reproduced to an accuracy of 14% and 13% by the PEG and IOS laws respectively. Results on the temperature dependence of the broadening coefficients for several spectral lines are also presented.