

MODELING N₂ AND H₂ BROADENED CH₄ INFRARED ABSORPTION SPECTRA. LINE-MIXING MODEL AND COMPARISONS WITH MEASUREMENTS

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Line-mixing effects have been studied in ν_3 and ν_4 bands of CH₄ perturbed by N₂ and H₂ at various temperatures. The absorption in the 1100-1500 and 2800-3200 cm⁻¹ spectral regions for total pressures in the 0.25-2 and 25-500 atm ranges have been measured. A line-mixing model is proposed which is based on state-to-state collisional transfer rates calculated from intermolecular potential surface with a semiclassical approach. The line-coupling relaxation matrix is constructed from these state-to-state collisional transfer rates and some empirical parameters. The results of comparisons between measurements and spectra computed accounting for and neglecting line-mixing prove the satisfactory quality of the model. Calculations with the line-mixing model of atmospheric spectra are also made.