

High Temperature Spectrum for ν_3 Band of Carbon Dioxide

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(Received: 2006-6-5; Revised: 2006-11-27)

Abstract: The total internal partition sums (TIPS) are calculated at the temperature up to 6000 K for $^{12}\text{C}^{16}\text{O}_2$. Using the calculated partition functions, we produce the line intensities of ν_3 band of $^{12}\text{C}^{16}\text{O}_2$ at several high temperatures. The results show that the calculated line intensities are in very good agreement with those of HITRAN database at the temperature up to 3000 K, which provides a strong support for the calculations of TIPS and line intensities at high temperature. Then the calculation is extended to further high temperature, and the simulated spectra of ν_3 band of $^{12}\text{C}^{16}\text{O}_2$ at 5000 and 6000 K are reported.

PACS: 33.20.Ea

Key words: partition functions, carbon dioxide, line intensities, high temperature

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