LINE INTENSITY MEASUREMENTS IN $^{14}N_2^{16}O$ AND THEIR TREATMENT USING THE EFFECTIVE OPERATOR APPROACH. II. THE 5200 TO 6400 CM^{-1} REGION

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This work continues a series of publications devoted to the application of the effective operators approach to the analysis and prediction of vibration-rotation spectra of linear triatomic molecules. In that frame, the present work aims at describing line intensities of cold and hot bands of $^{14}N_2^{16}O$ in its ground electronic state in the spectral range above 3600 cm^{-1}. In N_2O, vibrational interacting levels group in polyads, identified by the so-called polyad number $P = 2V_1 + V_2 + 4V_3$, as a result of the relation $2\omega_1 \sim 4\omega_2 \sim \omega_3$ existing between the harmonic frequencies.

The absorption spectra of N_2O, at room temperature, have been recorded in Brussels over the whole range between 3600 and 11000 cm^{-1} using a Bruker IFS120HR Fourier transform spectrometer. The measurement and analysis of absolute line intensities in the region between 4300 and 5200 cm^{-1}, involving bands associated with transitions corresponding to $\Delta P = 7, 8$ and 9, was done recently.[a] We are now measuring absolute line intensities for cold and hot bands associated with transitions corresponding to $\Delta P = 10$ and 11, observed in the range from 5200 to 6400 cm^{-1}. Using wavefunctions previously determined from a global fit of an effective hamiltonian to about 18000 line positions,[b] parameters of a corresponding effective dipole moment are then fitted to these experimental intensities. Results will be presented and discussed.

[a] L. Daumont, J. Vander Auwera, J-L. Teffo, V. I. Perevalov and S. A. Tashkun, J. Mol. Spectrosc. 208, 281-291 (2001).

[b] A. Camparque, G. Weirauch, S. A. Tashkun, V. I. Perevalov, and J-L. Teffo, J. Mol. Spectrosc. 209, 198-206 (2001).