DETERMINATION OF THE ν_9 BAND CENTER THROUGH THE FIRST HIGH-RESOLUTION ANALYSES OF THE ν_8 and $\nu_8 + \nu_9$ SPECTRAL REGIONS OF $^{35}ClONO_2$

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A ro-vibrational analysis of the C-type ν_8 fundamental band of $^{35}ClONO_2$ as well as the hot band, $\nu_8 + \nu_9 - \nu_9$, has been carried out using a Fourier-transform infrared spectrum of natural chlorine nitrate. This spectrum was recorded with a resolution of 0.00094 cm^{-1} at a temperature of 190 K. Accurate upper state constants have been determined for both bands including the following band centers: $\nu_0(\nu_8) = 711.20763(9)$ and $\nu_0(\nu_8 + \nu_9 - \nu_9) = 714.9050(12)$ cm^{-1}. These constants have been used, together with a transition moment operator which takes into account the observed Herman-Wallis effect, to successfully model the experimental spectrum. Moreover the constants of the $8^1 9^1$ state have been used to model the $\nu_8 + \nu_9$ band, allowing us to assign nearly 100 Q-branch transitions and, therefore, to determine the band center of the $\nu_8 + \nu_9$ band , $\nu_0(\nu_8 + \nu_9) = 838.6269(15)$ cm^{-1}. Consequently we are able for the first time to obtain a precise band center of ν_9 : $\nu_0(\nu_9) = 123.7219(20)$ cm^{-1}. Finally this establishes unambiguously that the band at 714.9 cm^{-1} previously attributed to $\nu_5 + \nu_7 - \nu_9$ is actually the $\nu_8 + \nu_9 - \nu_9$ hot band.