

FTIR SPECTRUM AND PERTURBATION ANALYSIS OF THE ν_2 BAND OF $^{15}\text{NO}_3$

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In 1987, Friedl and Sander^a reported observation of the FTIR spectrum of the ν_2 band of $^{14}\text{NO}_3$ in 762 cm^{-1} region, and rotational analysis was carried out for only transitions with $K=3$. The obtained negative centrifugal distortion constant D_N implied presence of perturbation from other states, but the perturbation analysis has not been carried out. In the present study, the ν_2 band of $^{15}\text{NO}_3$ was first observed in 742 cm^{-1} region. In contrast to the case of $^{14}\text{NO}_3$, rotational assignments were carried out for $K=0, 3, 6, 9, 12,$ and 15 , and transitions with $N \leq 12$ were fitted with usual energy level expression for D_{3h} molecule. However, when we included higher N transitions up to $N=22$, an effect of Coriolis interaction from $\nu_4=2$ appeared in negative D_N for $K=0$ and staggering in $K=3$. An energy matrix including $\ell=0$ and $\ell=\pm 2$ of $\nu_4=2$ and $\ell=0$ of $\nu_2=1$ was used to obtain the energy values of $\nu_2=1$, including the Coriolis and ℓ -type resonance terms. From the determined interaction constant between $\nu_2=1$ and $\nu_4=2$, anharmonic constant k_{444} was estimated, by assuming a mixing of $\nu_4=1$ and $\nu_4=2$.

^aR. R. Friedel and S. P. Sander, *J. Phys. Chem.* **91**, 2721 (1987).