

## THE FAR-INFRARED SPECTRUM OF ClNO<sub>2</sub> (NITRYL CHLORIDE)

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ClNO<sub>2</sub> is a molecule of potential stratospheric and tropospheric importance, formed by heterogeneous reactions on polar stratospheric clouds and sea-salt particles. In 1994, high-resolution infrared spectra of ClNO<sub>2</sub> were measured and analyzed in the 500–2500 cm<sup>-1</sup> range<sup>a</sup>. However, up to now, no high-resolution absorption spectra of the  $\nu_3$  and  $\nu_5$  fundamental bands of ClNO<sub>2</sub> in the far-infrared region were reported, except for microwave observation of a few transitions in the excited vibrational states<sup>b</sup>.

In the present study, absorption spectra in 300–500 cm<sup>-1</sup> range were recorded at resolutions of up to 0.0017 cm<sup>-1</sup>, using the Bruker IFS-120HR FTS at University of Giessen. Using these spectra, nearly 2000 transitions of the *a*-type  $\nu_3$  band around 370 cm<sup>-1</sup> were assigned. The *b*-type  $\nu_5$  band around 411 cm<sup>-1</sup> is too weak to be observed, in agreement with *ab-initio* predictions. However, the ( $\nu_2 - \nu_3$ ) *a*-type difference band was observed and could be used to confirm rotational constants of both vibrational states.

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<sup>a</sup>J. Orphal, *Ph.D. dissertation*, University of Paris-Sud (1995)

<sup>b</sup>Y. Morino and T. Tanaka, *J. Mol. Spectrosc.* **16**, 179 (1965)