

THE ROTATIONAL SPECTRUM OF CHLORINE NITRATE (ClONO₂) IN THE THREE LOWEST $n\nu_9$ POLYADS

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The rotational spectrum of the stratospherically important ClONO₂ molecule has recently been subjected to an extended analysis,^a which covered four states ranging from the ground state to the $\nu_5/\nu_6\nu_9$ dyad at $\approx 560\text{ cm}^{-1}$. The analysis was based on a newly recorded broadband FASSST spectrum with an almost complete coverage of the 118-378 GHz region.

The remaining vibrational states below 560 cm^{-1} are the three polyads associated with successively higher excitation of the ν_9 mode. These are the $(2\nu_9/\nu_7)$ dyad, the $(3\nu_9/\nu_7\nu_9)$ dyad, and the $(4\nu_9/\nu_72\nu_9/2\nu_7)$ triad. Rotational transitions in the triad were assigned for the first time and data sets for the two dyads were considerably improved over those obtained previously.^b Transition frequencies in all three polyads, for both ³⁵ClONO₂ and ³⁷ClONO₂, were fitted to within experimental accuracy by using a new coupling scheme which accounted in a unified manner for the pertinent Fermi and Coriolis interactions. Various tests used to ensure that the 'true' solution has been reached are discussed.

^aR.A.H. Butler et al., *J. Mol. Spectrosc.*, **243**, 1-9 (2007); **244**, 113-116 (2007).

^bR.A.H. Butler et al., *J. Mol. Spectrosc.*, **213**, 8-14 (2002); **220**, 150-152 (2003).