

FURTHER ANALYSIS OF THE LABORATORY ROTATIONAL SPECTRUM OF CH₃NCO

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Identification by the Rosetta mission that CH₃NCO is among the more plentiful molecules on the surface of the comet Churyumov-Gerasimenko stimulated rapid detection of this molecule in the interstellar medium.^{a,b} In particular, we have been successful in detecting almost 400 lines of CH₃NCO in Orion^b by extending the Koput^c cm-wave assignment to frequencies relevant to mm-wave radio-telescopes through measurement of the complete laboratory spectrum up to 363 GHz.^{b,d}

Presently, we describe further progress in understanding the laboratory rotational spectrum of CH₃NCO. Assignment has been extended to transitions with $K > 3$ by analysis of Stark and hyperfine patterns of the corresponding lowest- J transitions. Broadband spectra of synthesized pure ¹³CH₃NCO and CH₃N¹³CO isotopic species have also been recorded and assigned. Furthermore, the progress in fitting this very low barrier and highly perturbed internal rotation spectrum is described.

^aD.T.Halfen, V.V.Ilyushin, L.Ziurys, *ApJ* **812**, L5 (1915).

^bJ.Cernicharo, Z.Kisiel, B.Tercero, et al., *A&A* **587**, L4 (2016).

^cJ.Koput, *J. Mol. Spectrosc.* **115**, 131 (1986).

^dZ.Kisiel et al., 65th ISMS, Columbus, Ohio, RC-13 (2010); 70th ISMS, Champaign-Urbana, Illinois, TG-08 (2015).