LABORATORY ROTATIONAL SPECTRUM AND ASTRONOMICAL SEARCH OF S-METHYL THIOFORMATE

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Methyl thioformate $CH_3SC(O)H$, is a monosulfur derivative of methyl formate, a relatively abundant component of the interstellar medium (ISM)[a]. Methyl thioformate being the thermodynamically most stable isomer with a C_2H_4OS formula, it can be reasonably proposed for detection in the ISM. Theoretical investigations on this molecule have been done recently by Senent et al.[b]. Previous experimental studies on this molecule have been performed by Jones et al.[c] and Caminati et al.[d] and its microwave spectrum was recorded between 10 and 41 GHz.

In this study, S-methyl thioformate has been synthesized by reaction of methyl mercaptan with formic-acetic anhydride. The millimeter wave spectrum was then recorded for the first time from 150 to 660 GHz with the Lille's spectrometer based on solid-state sources [e]. Around 2300 lines were assigned up to $J = 70$ and $K = 15$ and a fit for the ground torsional state $\nu_t = 0$ performed with the *BELGI-C_s* code[f] will be presented and discussed. Our aim is to provide a line list for an astrophysical research.

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[a] E. Chruchwell, G. Winnewisser, A&A, 45, 229 (1975)

[b] M. L. Senent, C. Puzzarini, M. Hochlaf, R. Domínguez-Gómez and M. Carvajal, J. Chem. Phys., 141, 104303 (2014)

[c] G. I. L. Jones, D. G. Lister and N. L. Owen, J. Mol. Spectrosc., 60, 348 (1976)

[d] W. Caminati, B. P. V. Eijck and D. G. Lister, J. Mol. Spectrosc., 90, 15 (1981)

[e] O. Zakharenko, R. A. Motiyenko, L. Margulès, T. R. Huet., J. Mol. Spectrosc., 317, 41 (2015)

[f] J. T. Hougen, I. Kleiner, and M. Godefroid, J. Mol. Spectrosc. 163, 559 (1994)