

Laboratory measurement of methyl formate ($\text{HCOO}^{13}\text{CH}_3$)

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The methyl formate molecule is one of the most known interstellar weeds. The figure 1 shows the structure of methyl foamte. In most cases, saturated organic molecules like methyl formate have methyl group internal rotation which is equivalent to the vibrational mode of torsion. The interaction between the rotation and the internal rotations causes the splitting of the spectra. In addition, since the vibrational frequency of the torsion is usually low and vibrationally excited states are populated even at the room temperature, a great number of lines are observed but many lines remain unassigned. The progress of the laboratory measurement could help assignment of the astronomical detection. Recently unidentified lines from Orion KL were assigned to this molecule in its torsionally excited state [1] based on the previous microwave study.[2]

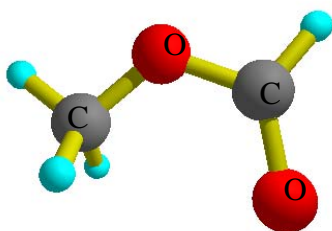


Fig. 1 The structure of methyl formate

Recently the production scheme of CCS was clarified using the observed abundance ratio of isotopomers. It is quite indispensable to have rest frequencies of the isotopomers. Therefore we report the current status of the microwave study on the isotopomer $\text{HCOO}^{13}\text{CH}_3$ anticipating for future detection. The first microwave study on this isotopomer was carried out by Curl.[3]

The experiment was carried out with our conventional source modulation microwave spectrometer. The microwave radiation from the synthesizer is multiplied and detected with the InSb bolometer. The ^{13}C isotopomer was synthesized by the reaction of HCOOH and $^{13}\text{CH}_3\text{OH}$. The observation of spectra from 75 GHz without gap is under way. The preliminary analysis will be given

References

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- [3] N. Sakai, M. Ikeda M. Morita, T. Sakai, S. Takano, Y. Osamura, & S. Yamamoto, 2007, ApJ 663, 1174.
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