CH_3SO

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Observation and Analysis of the Rotational Spectra of the CH_3SO Radical

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Rotational transitions of the CH_3SO radical, with resolved spin splittings and hyperfine splittings due to the H nuclei, have been observed by Fourier-transform microwave (FTMW) spectroscopy and FTMW - microwave (MW) double resonance spectroscopy. *A*-type transitions, $N = 1 \leftarrow 0$ and $N = 2 \leftarrow 1$ with $K = 0$, were observed by FTMW spectroscopy in the 15 GHz and 30 GHz regions, respectively. Furthermore, *b*-type transitions, $N = 1 \leftarrow 0$ and $N = 2 \leftarrow 1$ with $K = 1$, were observed by FTMW - MW double resonance spectroscopy to obtain much detailed information on the CH_3SO radical. Using a Hamiltonian described by the RAM, all the observed transitions including the internal-rotation sublevels, *A* and *E*, were simultaneously analyzed. The rotational energy level structures for the *A* and *E* states have been determined. Furthermore, the rotational constants and the fine and hyperfine constants have been determined precisely, and interesting features were revealed. The barrier height, V_3, to the internal rotation has been determined to be 373 cm^{-1}.

序

OH

CH_3SO

NO_2

OH

CH_3SO

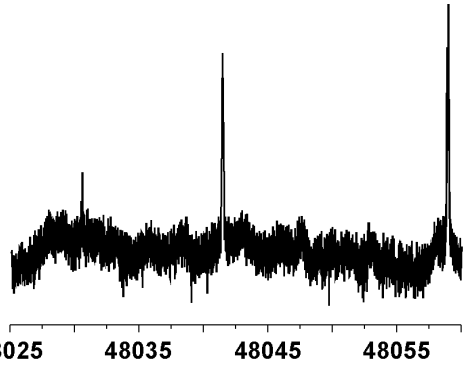

Fig. 1 CH_3SO

CH_3OO

V_3 [1]

CH_3OO CH_3SO FTMW

FTMW MW *a*-type

[2] $K = 0$

b-type

実験

FTMW FTMW

MW

O_2

10% 3

6atm CH_3SSCH_3

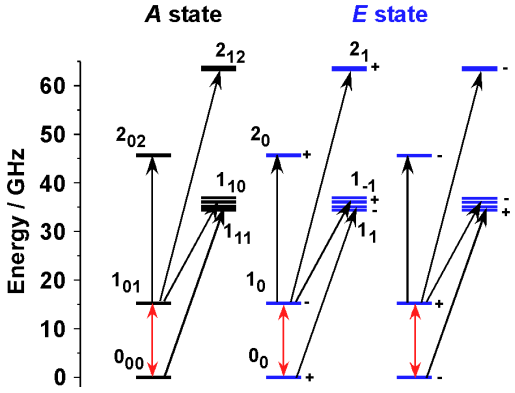

Fig.2 CH_3SO

a-type

b-type 1_{11}-1_{01} 2_{12}-1_{01} Fig.1

解析と結果

A N

1 0 N 2 1 *b*-type

Hamiltonian

100kHz RAM Hamiltonian

[3] A E 1_{11} 1_{01} 2_{12} 1_{01}

400kHz

RAM Hamiltonian A E

[1] 2005 2P122

[2] 2006 4B10

[3] E. Hirota, A. Mizoguchi, Y Ohshima, K. Katoh, Y. Sumiyoshi, and Y. Endo, *Mol. Phys*. *In press*.