

## MICROWAVE SPECTRUM OF THE H<sub>2</sub>S DIMER: OBSERVATION OF K<sub>a</sub>=1 LINES

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Large amplitude tunneling motions in (H<sub>2</sub>S)<sub>2</sub> complicate the analysis of its microwave spectrum. The previous rotational spectrum of (H<sub>2</sub>S)<sub>2</sub> was observed using the Balle-Flygare pulsed nozzle FT microwave spectrometers at NIST and IISc. For most isotopomers of (H<sub>2</sub>S)<sub>2</sub> a two state pattern of a-type K<sub>a</sub>=0 transitions had been observed and were interpreted to arise from E<sub>1</sub><sup>+/-</sup> and E<sub>2</sub><sup>+/-</sup> states of the six tunneling states expected for (H<sub>2</sub>S)<sub>2</sub>. K<sub>a</sub>=0 lines gave us only the distance between the acceptor and donor S atoms.<sup>a b c</sup> The (B+C)/2 for E<sub>1</sub> and E<sub>2</sub> states were found to be 1749.3091(8) MHz and 1748.1090(8) MHz respectively. In this work, we have observed the K<sub>a</sub>=1 microwave transitions which enable us to determine finer structural details of the dimer. The observation of the K<sub>a</sub>=1 lines indicate that (H<sub>2</sub>S)<sub>2</sub> is not spherical in nature, their interactions do have some anisotropy. Preliminary assignment of K<sub>a</sub>=1 lines for the E<sub>1</sub> state results in B=1752.859 MHz and C=1745.780 MHz. We also report a new progression of lines which probably belongs to the parent isotopomers.

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<sup>a</sup>F. J. Lovas, P. K. Mandal and E. Arunan, unpublished work

<sup>b</sup>P. K. Mandal Ph.D. Dissertation, Indian Institute of Science, (2005)

<sup>c</sup>F. J. Lovas, R. D. Suenram, and L. H. Coudert. 43rd Int.Symp. on Molecular Spectroscopy. (1988)