FOURIE TRANSFORM MICROWAVE SPECTRUM OF DIMETHYL ETHER DIMER

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The microwave spectrum of dimethyl ether dimer $(DME)_2$ has been observed using a Fourie transform microwave spectrometer at Shizuoka University from 5 to 18 GHz. The sample of 1% dimethyl ether in Ar was used to form the complex in a super sonic expansion. Sets of characteristic triplet lines with similar spectroscopic properties were found and assigned to be the $J = 4 \leftarrow 3$, $J = 5 \leftarrow 4$, and $J = 6 \leftarrow 5$ transitions of $(DME)_2$. The microwave spectrum of the six isotopomers $(DME)_2$, $(DME\text{-}d_6)_2$, $(DME\text{-}^{13}C_2)_2$, $(DME\text{-}d_6)\cdots(DME)$, $(DME\text{-}^{13}C_2)\cdots(DME)$, $(DME)\cdots(DME\text{-}^{13}C_2)$ have been assigned, leading to the precise spectroscopic constants. From the rotational constants of these six isotopomers molecular structure of dimethyl ether dimer was determined, being found to have C_s symmetry and to be bound with three O$\cdots$HC hydrogen bonds.The barrier height to internal rotation of the methyl group has been determined from the observed *A*-*E* splitting.