HIGH RESOLUTION ELECTRONIC SPECTRA OF 1,2-DIMETHOXYBENZENE AND THE 1,2-DIMETHOXYBENZENE/WATER COMPLEX[a]

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High resolution $S_1 \leftarrow S_0$ fluorescence excitation spectra of 1,2-dimethoxybenzene (DMB) and its water complex have been obtained and analyzed. The derived values of the rotational constants show that DMB itself has a planar heavy-atom structure with trans-disposed methoxy groups in both electronic states. No evidence for any other conformational isomers was found. The water complex origin appears 127 cm^{-1} to the blue of the bare molecule origin and is split into two spectra separated by 0.04 cm^{-1}. Analyses of these data show that the water molecule is attached via two O-H$\cdots$O hydrogen bonds to the methoxy groups, and undergoes a hindered internal rotation. Differences in the nature of this motion in the two electronic states will be discussed.

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