

MILLIMETER WAVE SPECTRA OF THE H₂-H₂O VAN DER WAALS COMPLEX

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Twelve pure rotational transitions of the highly non-rigid H₂-H₂O Van der Waals complex have been observed using a free jet expansion millimeter wave absorption spectrometer in the 70-210 GHz region. Following the recent infrared work of Weida and Nesbitt^a all the transitions are believed to originate from the ortho-H₂ j=1,Σ hydrogen internal rotation state. The water internal rotor states involved are the para-H₂O 0₀₀,Σ and the ortho-H₂O 1₀₁, Π_f and Π_e states. In addition, four rotational transitions of the H₂-D₂O complex have also been observed. Work is continuing in recording and analysing the spectra which will provide information on the potential energy surface for the complex and the interesting question of whether the water acts as a proton acceptor or donor, something which may depend on the hydrogen internal rotor state.

^aM. J Weida and D. J Nesbitt, J. Chem. Phys. 101, 5824 (1999).