INFRARED ABSORPTIONS OF THE H_2O—H_2 COMPLEX TRAPPED IN SOLID NEON

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The infrared spectrum of a mixture of H_2O and H_2 with a large excess of neon which has been deposited at 4.2 K includes several new absorptions which can be assigned to the H_2O—H_2 van der Waals complex. The H–H stretching vibration of the H_2 moiety is detectable even for very dilute concentrations of the complex. Small shifts in the position of the OH-stretching absorptions associated with vibrotational transitions of the H_2O moiety also are observed. The intensities of absorptions arising from nonrotating H_2O are considerably enhanced for the complex. Studies of samples enriched in D_2O and in D_2 give similar results. Since HD, unlike H_2 and D_2, is readily thermally depopulated to its J = 0 rotational state, this observation is consistent with the stabilization principally of the complex between H_2O and H_2 or D_2 in its J = 1 rotational state.