

DIODE LASER SPECTROSCOPY OF N₂-D₂O COMPLEX IN THE v₂ BEND REGION OF D₂O

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The rovibrational spectrum of N₂-D₂O complex was measured in the v₂ bend region of D₂O using a rapid-scan diode laser spectrometer to probe a pulsed supersonic slit jet. Three subbands, namely K_a = 1-0, 0-0, and 0-1, were recorded. All the transitions in the spectrum are doubled, due to D₂O tunneling within the complex. The spectrum was analyzed in terms of a standard asymmetric rotor Hamiltonian, yielding band origins, rotational and centrifugal distortion constants for the upper and lower tunneling levels. The band origin of N₂-D₂O is slightly blue-shifted from the monomer, indicating that the intermolecular bond becomes weaker upon vibrational excitation of the v₂ bend mode of D₂O. The tunneling dynamics within the complex will be discussed.