INFRARED COMBINATION AND DIFFERENCE BANDS OF THE NO DIMER

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The mid-infrared (1500 - 3800 cm^{-1}) absorption spectrum of gaseous nitric oxide has been studied at low temperature (99 K) with a long absorption path (160 m) in order to observe weak combination, difference, and overtone bands of the NO dimer. Ten new bands were assigned with greater or lesser certainty. Combined with previous results, they lead to a set of 12 secure and 7 tentative vibrational term values for $(NO)_2$, which almost double our knowledge of NO dimer vibrational states. The strongest non-fundamental bands in this region, after the ν_1 (symmetric N-O stretch) + ν_5 (asymmetric N-O stretch) overtone, involve combinations of ν_5 with ν_3 (intermolecular stretch). A new value of 155.5 cm^{-1} was obtained for ν_4, the elusive infrared-inactive out-of-plane fundamental. Excitation of ν_5 results in increased frequencies for the intermolecular modes ν_2, ν_3, and ν_4, consistent with the known strengthening of the intermolecular bond.