

ROTATIONAL SPECTRUM OF N₂-CO: THE ORTHO-N₂ AND PARA-N₂

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Observations of the infrared spectra of N₂-CO by diode laser spectroscopy have been reported previously^{a b}. The present study is an observation of the rotational spectra of ¹⁴N₂-CO, ¹⁵N¹⁴N-CO, and ¹⁵N₂-CO using a Fourier transform microwave spectrometer. Two sets for the J = 2-1, 3-2, and 4-3 transitions are observed for ¹⁴N₂-CO and ¹⁵N₂-CO, while only one set for ¹⁵N¹⁴N-CO. The hyperfine structures are observed for the complexes containing ¹⁴N nucleus. The first set is assigned to the K=0 state of ortho-N₂ and the second to the K=1 state of para-N₂, based on the infrared analysis and eQq splittings. The transitions with the K=1 state are stronger than those with the K=0 state for ¹⁴N₂-CO complex, while the reversed is observed for ¹⁵N₂-CO. In the case of ¹⁵N¹⁴N-CO only lowest transition is observed because of lack of symmetry in the complex. The nuclear electric quadrupole coupling constant of the ¹⁴N nucleus is much smaller than related complexes. The value of the van der Waals stretching frequency for N₂-CO is calculated to be 19 cm⁻¹ from the rotational and the centrifugal distortion constants obtained. We concluded that both moieties, N₂ and CO, are rotating almost freely in the complex N₂-CO.

^aY. Kawashima and K. Nishizawa, *Chem. Phys. Lett.* 249, 87 (1996)

^bY. Xu and A. R. W. McKellar, *J. Chem. Phys.* 104, 2488 (1996).