DETERMINATION OF THE STRUCTURE OF NEON CYCLOPENTANONE

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Rotational spectra of the neon cyclopentanone van der Waals complex were studied using a pulsed-jet Fabry-Perot Fourier transform microwave spectrometer. Spectra of the normal isotopomer along with those of five ^{13}C, the ^{18}O, and the ^{22}Ne substituted isotopomers were assigned in the frequency region of 6-23 GHz. The asymmetry of the neon location within the complex allows the observation of *a*, *b*, and *c*-type transitions. The rotational constants and centrifugal distortion constants for the parent isotopomer were determined to be A = 2728.8119(7), B = 1736.5880(5), and C = 1440.4682(5) MHz; and Δ_J = 15.051(7), Δ_{JK} = -13.96(4), Δ_K = 49.97(5), δ_J = 3.603(3), and δ_K = 6.55(8) kHz. The coordinates of the neon in the principal axis system of C_5H_8O are a = 0.91, b = 0.78, and c = 3.26 Å, where the carbonyl bond lies along the *a*-axis and the oxygen position is a = 2.05 Å. Comparisons between the bonding and wide amplitude motions of the rare gases in the neon verses the argon cyclopentanone complexes will be discussed.