DETERMINATION OF THE STRUCTURE OF THE ARGON CYCLOPENTANONE AND NEON VAN DER WAALS COMPLEXES

WEI LIN, *Department of Chemistry and Environmental Sciences, University of Texas at Brownsville, 80 Fort Brown - MO1.114, Brownsville, TX 78520*; DANIEL J. FROHMAN, ANDREW H. BROOKS, *Department of Chemistry, Wesleyan University, Hall-Atwater Laboratories, 52 Lawn Avenue, Middletown, CT 06459-0180*; ANDREA J. MINEI, *Division of Natural Sciences, Chemistry Department, College of Mount Saint Vincent, 6301 Riverdale Avenue, Riverdale, NY 10471*; CHINH H. DUONG, STEWART E. NOVICK, and WALLACE. C. PRINGLE, *Department of Chemistry, Wesleyan University, Hall-Atwater Laboratories, 52 Lawn Avenue, Middletown, CT 06459-0180*.

The microwave spectrum of the ^{36}Ar-cyclopentanone van der Waals complex has been observed and assigned. The rotational constants are A = 2616.10 MHz, B = 1176.62 MHz, and C = 1022.089 MHz. The results of microwave spectra of the seven isotopomers of the argon-40 cyclopentanone and eight isotopomers of the neon-20 (including ^{22}Ne) cyclopentanone van der Waals complexes in the ground vibrational state have already been reported. The structures of both the argon and neon complexes were determined using extreme Kraitchman analysis. The coordinates of the Ne-20 and Ne-22 isotopologues are nearly equal in the principal axis system of the monomer. Also, the coordinates of the Ar-36 and Ar-40 isotopologues are nearly equal in the principal axis system of the monomer. These results will be discussed in terms of the vibrational averaging in the ground vibrational states of the large amplitude van der Waals vibrations.