ROTATIONAL SPECTROSCOPIC STUDY OF He_N-CO CLUSTERS

YUNJIE XU and WOLFGANG JÄGER, *Department of Chemistry, University of Alberta, Edmonton, AB, Canada, T6G 2G2*.

In this report, we present the investigation of rotational spectra of a carbon monoxide molecule solvated by helium atoms with a Fourier transform microwave spectrometer. An infrared spectroscopic study of He_N-CO (N=2-20) clusters was reported recently.[a] Because of the very low rotational temperature achieved, only transitions originating from the lowest rotational energy level J=0 were detected. It was therefore not possible to fully separate the rotational and vibrational contributions to the observed line positions. The current study provides complementary information about the rotational dynamics of these clusters. This allows the separation of rotational and vibrational contributions. The obtained rotational constants are interpreted in terms of cluster structure and dynamics. The trend in the obtained rotational constants as a function of number of helium atoms will be compared to the limiting value in the helium nanodroplet and to other related clusters.

[a] J. Tang and A. R. W. McKellar, *J. Chem. Phys.* **119**, 754 (2003).