HIGH RESOLUTION INFRARED SPECTRUM OF THE RING-PUCKERING BAND, ν_{10}, OF DIBORANE

W. J. LAFFERTY, *Optical Technology Division, NIST, Gaithersburg, MD 20899-8441*; J.-M. FLAUD, *Laboratoire de Photophysique Moléculaire, CNRS, Université de Paris Sud, Orsay, 91405 FRANCE*; R. L. SAMS, T. A. BLAKE and S. W. SHARPE, *Pacific Northwest National Laboratory, P.O. Box 999, Richland, WA 99352*.

We are in the process of studying all the infrared active fundamentals of diborane; the spectrum from 280 cm^{-1} to 2700 cm^{-1} has been recorded, and band-by-band analysis is in progress. The analysis of the lowest frequency band centered near 369 cm^{-1} , ν_{10}, which results from the ring puckering vibration, will be presented in this talk. The spectrum of a sample with boron in natural abundance (19 % ^{10}B, 81% ^{11}B) as well as one enriched in ^{10}B has been obtained with a resolution of 0.0015 cm^{-1} and a S/N of better than 500 to 1. This band appears to be the only unperturbed band in the diborane spectrum, and assignment of the three beautiful b-type bands of the $^{10}B_2H_6$, $^{10}B^{11}BH_6$ and $^{11}B_2H_6$ isotopomers was straightforward despite the fact that the band centers of all three isotopomers fall within 0.05 cm^{-1} of each other. In the enriched ^{10}B sample the hot band, $2\nu_{10}$-ν_{10}, could be completely assigned and spectroscopic constants obtained for the A_g $2\nu_{10}$ state.