THE INVERSION SPLITTING OF $^{15}NH_2D$ AND $^{15}ND_2H$ AS OBTAINED FROM THEIR FIR SPECTRA

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The far infrared absorption spectra of the partially deuterated species $^{15}NH_2D$ and $^{15}ND_2H$ have been recorded in the 20 to 105 cm^{-1} region using a Brucker IFS 120 Fourier transform spectrometer. A 25 cm long absorption cell with teflon windows was filled with different mixtures of $^{15}NH_3$ and $^{15}ND_3$ at total pressures ranging from 0.8 to 2 mbar. Several spectra with different $^{15}NH_2D$ to $^{15}ND_2H$ ratio were thus recorded. For all spectra the maximum path length was used resulting in a 2×10^{-3} cm^{-1} resolution.
Prior to the line assignment, rotational constants for $^{15}NH_2D$ and $^{15}ND_2H$ where calculated from those of $^{14}NH_2D$ and $^{14}ND_2H$. The IAM-type theoretical approach developed by Cohen and Pickett,[a] which accounts for the large amplitude inversion motion and its coupling with the overall rotation, was afterwards used to obtain rovibrational energies and predicted spectra. In the case of $^{15}NH_2D$, observed line positions for low-J lines were sometimes within 0.050 cm^{-1} from their predicted values.
The line position analyzes are still in progress. For both species, they are carried out with the help of the IAM-type theoretical approach.[a] For $^{15}NH_2D$ more than 300 a- and c-type lines have already been assigned and the observed wavenumbers are reproduced with an RMS deviation of 0.4×10^{-3} cm^{-1}. This will be discussed in the paper and the values obtained for the spectroscopic constants will be reported and compared to those obtained by Fusina *et al.*[b] for the ^{14}N-species. The decrease of the tunneling inversion splitting which goes from 0.406 cm^{-1} in $^{14}NH_2D$[b] to 0.383 cm^{-1} in $^{15}NH_2D$ will also be discussed.

[a] E. A. Cohen and H. M. Pickett, *J. Molec. Spectrosc.* **93,** 83 (1982).
[b] L. Fusina, G. Di Lonardo, J. W. C. Johns and L. Halonen, *J. Molec. Spectrosc.* **127,** 240 (1988).