

Self- Broadening and Shifting Coefficients of Rovibrational Lines in the First Overtone Band of HBr

Alexandra Domanskaya¹, Ruslan E. Asfin², Christof Maul³

¹University of Göttingen, Germany, domav@yandex.com;

²St. Petersburg State University, Russia, R.Asfin@spbu.ru;

³Technische Universität Braunschweig, Germany, c.maul@tu-braunschweig.de

The spectra of pure HBr in the region of the first of overtone were recorded at sub-atmospheric pressures with a Bruker IFS 120 HR with 0.003 cm^{-1} spectral resolution. Voigt profiles were found to describe adequately the isotopically resolved ro-vibrational lines. Self-broadening/shifting coefficients as well as the intensity of the lines were evaluated¹. No statistically significant difference between broadening and shifting coefficients for different isotopologues was found.

The broadening coefficients are in good agreement with literature values, though having smaller uncertainties ($\sim 1\%$ for $-10 \leq m \leq +8$ at the confidence level of 95%). A difference between the values in P-branch of our data and HITRAN is worth noting. HITRAN values were obtained by mirroring the broadening coefficients of the R-branch, therefore neglecting the broadening coefficients asymmetry which is definitively detected in our work. The shifting coefficients were reported for the first time to the best of our knowledge. Measured intensities are in reasonable agreement with previously reported values and with data of the HITRAN database.

References

[1] R.E. Asfin, A. Domanskaya, C. Maul, *Opt. Spectr.* **130**, 1, 2022.