HIGH-RESOLUTION SPECTROSCOPY OF HOBr IN THE FAR- AND NEAR-INFRARED

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Hypobromous acid, HOBr, is an important species in atmospheric chemistry. In the stratosphere it is mainly produced by the reaction between BrO and HO_2 but rapidly photolyzed by sunlight. In the marine troposphere it is also formed by heterogeneous reactions on sea-salt aerosols and is thus involved in the transport of bromine from the oceans into the atmosphere. Attempts to measure atmospheric HOBr concentrations have been made[a] using its far-infrared rotational transitions. In order to provide accurate line positions and intensities in this region we have measured high-resolution Fourier-transform absorption spectra of gaseous HOBr between 100–350 cm^{-1} using the Bruker IFS-120 HR at LPPM in Orsay. We have been able to improve the rotational-vibrational parameters of the ground states[b] and of the ν_3 bands of $HO^{79}Br$ and $HO^{81}Br$ around 620 cm^{-1}. For the rotational line intensities we have taken into account the Herman-Wallis effects. Furthermore, we have measured high-resolution absorption spectra of the $2\nu_1$ bands around 1.4 μm and determined their rotational-vibrational parameters. These overtone bands are observed to be even stronger than the ν_3 fundamental bands, in agreement with *ab-initio* calculations[c]. The results might be useful for detection of atmospheric HOBr using Cavity Ring-Down Spectroscopy with telecommunication diode-lasers operating at room temperature.

[a] D. G. Johnson, W. A. Traub, K. V. Chance, and K. W. Jucks, Geophys. Res. Lett. 22, 1373 (1995)
[b] E. A. Cohen, G. A. McRae, T. L. Tan, R. R. Friedl, J. W. C. Johns, and M. Noël, J. Mol. Spectrosc. 173, 55 (1995)
[c] K. A. Peterson, J. Chem. Phys. 113, 4598 (2000)