HALF-WIDTHS, THEIR TEMPERATURE DEPENDENCE, AND LINE SHIFTS FOR THE ROTATION BAND OF $H_2{}^{16}O$

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Complex Robert-Bonamy (CRB) calculations of the half-width, its temperature dependence, and the line shift have been made for the rotation band transitions of $H_2{}^{16}O$ for N_2 and O_2, as the bath molecule. First the atom-atom component of the intermolecular potential was adjusted to reproduce the half-widths of the 22 and 183 GHZ transition determined by Payne et al. (IEEE Trans. Geosci Remote Sens. 2007; 46: 3601-17). Then the line shape parameters were determined at seven temperatures (200., 225., 275., 296., 350., 500., and 700. K) for the H_2O-N_2 and H_2O-O_2 systems. The air broadened values were determined at each temperature by the standard method. The half-widths, their temperature dependence, and the line shifts were studied as a function of the rotational quantum numbers. The calculations are compared with measurement.