

DOPPLER LIMITED SPECTROSCOPY OF THE rQ_2 -BRANCH OF HSOH AT 935 GHz

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Hydrogenthioperoxide or Oxadisulfane, HSOH, has been uniquely characterized by its recorded millimeter wave spectrum to be a nonplanar molecule with a structure analogous to the two “parent” molecules HSSH and HOOH. Because of their near right-angle chain structures, HSOH and the isotopically substituted forms are nearly accidental symmetric tops, but they possess dipole moments essentially perpendicular to the pseudo-symmetry axis. In the case of HSOH, two perpendicular dipole moment components exist, pointing in the direction of the *b*- and *c*-axis. This leads to rotational spectra consisting of compact *Q*-branches and regular, in principle easily discernable *P*- and *R*- branches. *P*-, *Q*- and *R*- branches form bandheads in dependence of the quantum number *J*. For HSOH we have scanned the frequency region of the expected band centers of $K_a = 1 - 0, 2 - 1, 3 - 2$ which occur at frequencies covering the entire frequency region of the Cologne Terahertz spectrometer. These band centers are located at 187 GHz, 561 GHz, and 935 GHz for the rQ_0 -, rQ_1 -, and rQ_2 -branches, respectively.

We will give a demonstration of the complexity of the rQ_2 -branch at 935 GHz and will present the assignment. The derived preliminary rotational constants are: $A = 202069$ GHz, $B = 15282$ GHz, and $C = 14840$ GHz.