THE PURE ROTATIONAL SPECTRA OF CrS ($X^5\Pi_r$): CONTINUED STUDIES OF THE 3d TRANSITION METAL SULFIDES

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The pure rotational spectrum of CrS has been measured in the ground $X^5\Pi_r$ state using gas-phase direct absorption methods in the frequency range of 280-405 GHz. The molecule was created by the reaction of chromium vapor, sublimed in a Broida oven, with hydrogen sulfide gas. All five spin components were observed in eleven rotational transitions, and lambda-doubling splitting were resolved in the Ω = 0, 1 and 2 ladders. The data were fit with a Hunds case(a) Hamiltonian and rotational, spin-orbit, spin-spin, and lambda-doubling constants have been established. A bond length of 2.0781 Å was derived from the data. Using the lambda-doubling parameters, the energy difference between the ground $X^5\Pi$ and excited $^5\Sigma$ state was estimated to be 1400 cm $^{-1}$.