ROTATIONAL AND ISOTOPIC STUDY OF THE ZnBr RADICAL ($^2\Sigma^+$)

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The pure rotational spectrum of ZnBr ($^2\Sigma^+$) has been recorded using millimeter-wave direct absorption spectroscopy. This species was generated in the gas phase via the reaction of zinc vapor with CH_3Br in the presence of a DC discharge. Multiple rotational transitions were measured for 6 isotopologues ($^{64}Zn^{79}Br$, $^{64}Zn^{81}Br$, $^{66}Zn^{79}Br$, $^{66}Zn^{81}Br$, $^{68}Zn^{79}Br$, and $^{68}Zn^{81}Br$) in the frequency range of 270-300 GHz, each of which consisted of spin-rotation splittings. Furthermore, transitions originating in the v = 1 through 3 excited vibrational states for certain isotopologues were obtained. The equilibrium rotational constant for $^{64}Zn^{79}Br$ (B_e) was calculated to be near 2780 MHz, resulting in an equilibrium bond length (r_e) of 2.25 Å.