THE CHARACTERIZATION OF HYPERFINE EFFECTS IN YTTERBIUM HALIDE DIATOMIC MOLECULES USING MWFT SPECTROSCOPY

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The Ytterbium atom is isovalent with the alkaline earth metals by virtue of its $4f^{14}6s^2$ ground state configuration. Data obtained from studies on diatomic molecules containing Yb therefore provide appropriate parameters for comparison with alkaline earth metal analogs. In this work, the microwave spectra of YbBr, YbCl and YbF have been assigned for the $^2\Sigma^+$, v = 0 ground state. Precise rotational constants and several hyperfine parameters have been obtained. In addition, studies of the v = 1 levels for the most abundant isotopomers of YbF and YbCl have provided equilibrium bond lengths and a measure of the vibrational dependence for each of the fitted parameters. The determined hyperfine constants have been used to provide information about the electronic structures of the molecules.