THE OPTICAL STARK SPECTRUM OF THE $A^3\Phi_1 - X^3\Phi_1$ BAND SYSTEM OF IRIDIUM MONOFLUORIDE, IrF

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Recently the New Brunswick group\(^5\) reported on the field-free detection and analysis of the $A^3\Phi_1 - X^3\Phi_1$ band system of IrF. Here we report on the analysis $Q(4)(15922 \text{ cm}^{-1})$ branch feature of the $(1,0)$ band of the $^{197}\text{IrF}$ isotopologue of that system recorded at field strengths of up to 3000 V/cm. The spectra are surprisingly complex at the achieved resolution of 40 MHz due to the presence of both the $^{197}\text{Ir}(I=3/2)$ and $^{19}\text{F}(I=1/2)$ magnetic hyperfine splitting. The determined permanent electric dipole moment, $\mu_{el}$, for the $X^3\Phi_1$ state is compared with that recently determined\(^4\) for the $X^3\Phi_1$ state of isovalent CoF. The trend in $\mu_{el}$ amongst the ground states of IrF, IrC and IrN\(^-\) will be discussed. Finally, a simple molecular orbital correlation diagram will be used to rationalize the change in $\mu_{el}$ upon excitation from the $X^3\Phi_1$ to $A^3\Phi_1$ state.

