AN OPTICAL-OPTICAL DOUBLE-RESONANCE SPECTROSCOPIC STUDY OF FOUR ION-PAIR STATES OF CLF AND IDENTIFICATION OF THE CLF($A$) VALENCE STATE

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Four ion-pair states of ClF, $E\ 0^+(^3P_2)$, $f\ 0^+(^3P_0)$, $\beta\ 1(^3P_2)$ and $G\ 1(^3P_1)$, have been identified by sequental excitation via the $B\ ^3\Pi_{0+}$ valence state. Excitation spectra and fluorescence spectra have been acquired, which permit the assignment of vibrational energies and rotational constants to 31 levels. These four ion-pair states exhibit complex homogeneous and heterogeneous interactions and neither the vibrational nor rotational constants are regular with increasing vibrational quantum number. The vibrational and rotational constants of the $A\ ^3\Pi_1$ state were identified from the low resolution $\beta - A$ emission spectra and the dissociation limits of ClF ($B\ ^3\Pi_{0+}$) and ClF($A\ ^3\Pi_1$) are discussed. The dissociation energy of ClF ($X$) is confirmed to be 21110 cm$^{-1}$. Some qualitative information also was obtained about the $D'\ 2(^3P_2)$ and $A'\ ^3\Pi_2$ states.

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