FOURIER TRANSFORM EMISSION SPECTROSCOPY OF THE $G\ ^3\Phi - X\ ^3\Phi$, $C\ ^3\Delta - X\ ^3\Phi$ AND $G\ ^3\Phi - C\ ^3\Delta$ SYSTEMS OF CoCl

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The emission spectrum of CoCl has been recorded in the 2000–20000 cm^{-1} region using a Fourier transform spectrometer. The bands were excited in a carbon tube furnace by heating $CoCl_2$ to a temperature of about 2200°C. The bands observed in the 2000–12000 cm^{-1} interval have been classified into three transitions: $G\ ^3\Phi - X\ ^3\Phi$, $C\ ^3\Delta - X\ ^3\Phi$ and $G\ ^3\Phi - C\ ^3\Delta$, analogous to the near infrared transitions of CoF [R. S. Ram, P. F. Bernath and S. P. Davis, J. Chem. Phys. 104, 6949 (1996)]. Two sub-bands with 0–0 origins near 10486.9 and 10449.9 cm^{-1} have been assigned as the $^3\Phi_3 - ^3\Phi_3$ and $^3\Phi_4 - ^3\Phi_4$ sub-bands of the $G\ ^3\Phi - X\ ^3\Phi$ transition. Two other 0–0 bands with origins near 2636.6 and 2726.7 cm^{-1} have been assigned as $^3\Delta_2 - ^3\Phi_3$ and $^3\Delta_3 - ^3\Phi_4$ sub-bands of the $C\ ^3\Delta - X\ ^3\Phi$ transition. In addition, two very weak bands observed with origins near 7850.3 and 7723.2 cm^{-1} have been identified as the 0–0 bands of the $^3\Phi_3 - ^3\Delta_2$ and $^3\Phi_4 - ^3\Delta_3$ sub-bands of the $G\ ^3\Phi - C\ ^3\Delta$ transition. A rotational analysis of a number of vibrational bands of these transitions has been obtained and spectroscopic constants for the low-lying electronic states of CoCl have been determined.