FOURIER TRANSFORM SPECTRA OF COPPER DICHLORIDE : RENNER-TELLER EFFECT IN ROVIBRONIC LEVELS OF THE GROUND STATE

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High-resolution Fourier transform spectra of the laser-induced fluorescence of $^{63}\text{Cu}^{37}\text{Cl}_2$ produced in a cell have been recorded following excitation of a single vibronic level of the $E^5\Pi_g$ electronic state. Fluorescence occurs in combination bands to a broad spread of rovibrational levels in the ground electronic state, $X^5\Pi_g(3/2)$. A global rovibronic model is proposed for the ground state based on an effective Hamiltonian, which fits experimental data (2782 fluorescence lines, lower state quantum numbers : $v_1 = 0 - 6, v_2 = 0 - 2, v_3 = 0 - 4, \text{ and } J = 4 \frac{1}{2} - 80 \frac{1}{2}$) with a root mean square error of 0.019 cm$^{-1}$. Vibrational, rotational and Renner-Teller parameters are obtained (e.g. $\omega_2 = 95.195 \text{ cm}^{-1}, B_\epsilon = 0.055106(3) \text{ cm}^{-1}, \epsilon = -0.1893$). A revised value for the equilibrium internuclear distance Cu-Cl is deduced: $r_e$ (Cu-Cl) = 0.20341(3) nm.