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 $^{63}Cu^{37}Cl_2$ produced in a cell have been recorded following excitation of a single vibronic level of the $E\ ^2\Pi_u$ electronic state. Fluorescence occurs in combination bands to a broad spread of rovibrational levels in the ground electronic state, $X\ ^2\Pi_{g(3/2)}$.

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 : $v_1 = 0 - 6, v_2 = 0 - 2, v_3 = 0 - 4$, 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. ω_2 = 95.195 cm^{-1}, B_e = 0.055106(3) cm^{-1}, ϵ = - 0.1893). A revised value for the equilibrium internuclear distance Cu-Cl is deduced: r_e (Cu-Cl) = 0.20341(3) nm.