ULTRAHIGH-RESOLUTION SPECTROSCOPY AND THE ZEEMAN EFFECT OF NAPHTHALENE $S_1 \leftarrow S_0$ TRANSITION

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Rotationally resolved high-resolution fluorescence excitation spectra of several vibronic bands of naphthalene $S_1 \leftarrow S_0$ transition have been observed by crossing a single-mode UV laser beam perpendicular to a collimated molecular beam. The 0_0^0 and $0_0^0 + 435$ cm^{-1} bands were reported in our previous papers. [a] [b] Several thousands rotational lines were observed and assigned. The molecular constants were determined for each band in high accuracy. By comparing the observed and calculated transition energy from the determined molecular constants, the local energy shifts were found and identified as originating from Coriolis interaction in the higher energy bands. Additionally, we have observed the change of the spectra with magnetic field. The magnitude of the observed Zeeman splitting is very small. The broadening was mainly observed for the levels of low K_a and the magnitude was increasing in proportion to J for given K. It indicates the magnetic moment is along to c-axis (out of plane) and originates from an electronic angular momentum induced by $J - L$ coupling between the S_1 and S_2 states. [c]

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