

LASER INDUCED FLUORESCENCE STUDIES OF JET-COOLED CF_2 : DETERMINATION OF \tilde{A} -STATE STRETCHING FREQUENCIES

CHUJI WANG, CONGXIANG CHEN, JINGHUA DAI, and XINGXIAO MA, *Department of Chemical Physics, University of Science and Technology of China, Hefei, Anhui 230026, P. R. China.*

Laser induced fluorescence (LIF) excitation spectra of $\text{CF}_2 \tilde{A}^1B_1 \leftarrow \tilde{X}^1A_1$ system around 250 nm has been measured under supersonic free-jet conditions. CF_2 radical was produced by DC-discharge of CF_4 seeded in argon. The spectra present the overall spectral features of this system, from the band origin to \tilde{A} -state predissociation threshold that is measured to be 5.4eV. The previously ambiguous assignments of \tilde{A} -state stretching frequencies have been experimentally determined to be $\nu'_1 = 1012.1 \text{ cm}^{-1}$, $\nu'_3 = 1180.2 \text{ cm}^{-1}$, by analyzing the rotational subband spectra attributed to some of the observed progressions (2_0^n , $1_0^1 2_0^{n-2}$ and $2_0^0 3_1^1$ ($n \leq 11$)) in which 30 vibronic bands were first unambiguously labeled. The measured \tilde{A} -state stretching frequencies do not support King's [*J. Mol. Spectry*, **1**, **78**(1979)] tentative assignments, but are in good agreement with Cameron's [*J. Chem. Phys.* 4475, **103**(1995)] theoretical assertions. Furthermore, the systematic and detail measurements of the rotationally resolved LIF spectrum of this system for all the transitions in 2_0^n and $1_0^1 2_0^{n-2}$ progressions have been conducted. The rotational and centrifugal constants of all $(0, n, 0)$ and $(1, n - 2, 0)$ vibrational levels in \tilde{A} -state are derived by least-squares fit. Some negative inertial defects are tentatively explained resulted from local perturbation.