LASER INDUCED FLUORESCENCE SPECTROSCOPY OF JET COOLED SiCN : ROTATIONAL ANALYSIS OF THE HOT BANDS

MASARU FUKUSHIMA and TAKASHI ISHIWATA, *Faculty of Information Sciences, Hiroshima City University, Asa-Minami, Hiroshima 731-3194, Japan*.

We have generated SiCN in supersonic free jet expansions, and observed the laser induced fluorescence (LIF) of the vibrationally hot bands of the $\tilde{A}\ ^2\Delta$ – $\tilde{X}\ ^2\Pi$ transition. We have measured dispersed fluorescence (DF) spectra from the single vibronic levels (SVL's), $\tilde{A}\ (01^10)\ ^2\Phi$ and $^2\Pi$, and rotationally resolved LIF excitation spectra of the two hot bands, $\tilde{A}\ (01^10)\ ^2\Phi$ – $\tilde{X}\ (01^10)\ ^2\Delta$ and $\tilde{A}\ (01^10)\ ^2\Pi$ – $\tilde{X}\ (01^10)\ ^2\Sigma^{(-)}$. The rotational energy levels were reasonably analyzed as those of the $^2K'$ – $^2K''$ transitions, but their line intensities calculated from the Hönl-London factors derived in the intermediate case between Hund's case (a) and (b) could not reproduce the observed spectra. The Hönl-London factors derived in the $^2\Lambda'$ – $^2\Lambda''$ ($^2\Delta$ – $^2\Pi$) transition reasonably reproduced the spectra. It indicates that coupling between the electronic orbital and vibrational angular momenta is weak in the SiCN $^2\Delta$ – $^2\Pi$ system, and a basis set of $|\Lambda\ v_2\ l\ \Sigma; J\ P\ M_J\rangle$, so-called "$l$-basis", better describes the system than that of $|\Lambda\ v_2\ K\ \Sigma; J\ P\ M_J\rangle$.