ELECTRONIC TRANSITIONS OF THE HC_4S AND HC_6S RADICALS STUDIED BY LASER INDUCED FLUORESCENCE SPECTROSCOPY

MASAKAZU NAKAJIMA, YOSHIHIRO SUMIYOSHI and YASUKI ENDO , *Department of Basic Science, Graduate School of Arts and Sciences, The University of Tokyo, Tokyo 153-8902, Japan*.

Laser induced fluorescence spectra of two new vibronic band systems have been observed by discharging a mixture gas, C_2H_2 0.5%/CS_2 0.3% diluted in Ar, in a supersonic jet. All the bands were assigned to $^2\Pi_{3/2} -^2 \Pi_{3/2}$ transitions by measuring rotationally resolved spectra. Based on the chemical composition and the ground state combination differences, the spectral carriers were assigned to the HC_4S and HC_6S radicals. The homogeneous width of the excitation spectra of the HC_6S radical is larger than that of HC_4S by 0.02 cm^{-1} (FWHM), which was interpreted as the lifetime broadening of the excited state, corresponding to 270 ps. Vibronic origin of HC_4S is located at 500.5 nm, and that of HC_6S is at 589.6 nm. Main progressions of both the vibronic systems are assigned to the excitations of the C-S stretching modes, of which frequencies were determined to 505 cm^{-1} for HC_4S, 435 cm^{-1} for HC_6S.