ELECTRONIC SPECTRA OF A DISCHARGE PRODUCT OF CARBON DISULFIDE: DETECTION OF A NEW IONIC SPECIES

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New electronic transition has been observed in the 18400−19800 cm^{-1} region by discharging the CS_2 molecule in a supersonic jet using a laser induced fluorescence technique. Since the vibronic bands completely disappear when the C_2H_2 sample is used, the spectral carrier contains the sulfur atom. Rotationally resolved spectra were obtained by high-resolution laser scans. The band type of all the bands is assigned to $^2\Pi_{3/2} -^2 \Pi_{3/2}$, and the effective rotational constant of the ground electronic state has been determined to be 0.05047(4) cm^{-1}. We concluded that the ground state of the radical is $^2\Pi_i$, and the spectral carrier may be an ionic species because both the carbon and sulfur atoms have even numbers of electrons. Based on the results of $ab\ initio$ calculations, it is considered that the negative ion, $SCCS^-$, is the most probable candidate for the spectral carrier.