

## INFRARED BANDS OF CS<sub>2</sub> DIMER AND TRIMER AT 4.5 $\mu$ m

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We report observation of new infrared bands of (CS<sub>2</sub>)<sub>2</sub> and (CS<sub>2</sub>)<sub>3</sub> in the region of the CS<sub>2</sub>  $\nu_1 + \nu_3$  combination band (at 4.5  $\mu$ m) using a quantum cascade laser. The complexes are formed in a pulsed supersonic slit-jet expansion of a gas mixture of carbon disulfide in helium. We have previously shown that the most stable isomer of (CS<sub>2</sub>)<sub>2</sub> is a cross-shaped structure with D<sub>2d</sub> symmetry and that for (CS<sub>2</sub>)<sub>3</sub> is a barrel-shaped structure with D<sub>3</sub> symmetry. The dimer has one doubly degenerate infrared-active band in the  $\nu_1 + \nu_3$  region of the CS<sub>2</sub> monomer. This band is observed to have a rather small vibrational shift of -0.846 cm<sup>-1</sup>. We expect one parallel and one perpendicular infrared-active band for the trimer but observe two parallel and one perpendicular bands. Much larger vibrational shifts of -8.953 cm<sup>-1</sup> for the perpendicular band and -8.845 cm<sup>-1</sup> and +16.681 cm<sup>-1</sup> for the parallel bands are observed. Vibrational shifts and possible vibrational assignments, in the case of the parallel bands of the trimer, are discussed using group theoretical arguments.