INFRARED SPECTROSCOPY OF OCS CLUSTERS

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Previously, the non-polar lowest energy isomer of $(OCS)_2$ has been studied via infrared spectroscopy, while the polar form has only been deduced from qualitative beam "refocusing" experiments. The spectrum and the structure of OCS trimer are known from mm-wave spectroscopy. Infrared spectra of the $(OCS)_2$, $(OCS)_3$ and $(OCS)_4$ van der Waals complexes have been studied in the region of the C-O stretching fundamental using a tunable diode laser to probe a pulsed supersonic slit jet. We have measured a new infrared band at 2069.3 cm^{-1} and assigned it to the long-anticipated polar isomer of OCS dimer, helping to explain apparent discrepancies among earlier studies. A trimer band of OCS has also been assigned based on lower state combination differences. The upper state of this band is perturbed and the nature of the perturbations is not clear. Four other bands have also been observed and tentatively assigned to OCS tetramer. These bands are best described as an asymmetric top with an accidental spherical top structure. Isotopic studies of these bands are presently underway to clarify their origin.