INFRARED SPECTRA OF CARBONYL SULFIDE-ACETYLENE TRIMERS: OCS-(C$_2$H$_2$)$_2$ AND TWO ISOMERS OF (OCS)$_2$-C$_2$H$_2$

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Spectra of acetylene-carbonyl sulphide trimers in the region of the OCS $\nu_1$ fundamental ($\sim$2062 cm$^{-1}$) are observed using a tunable diode laser to probe a pulsed supersonic slit jet expansion. A previous microwave study of (OCS)$_2$-C$_2$H$_2$ by Peebles and Kuczkowski$^a$ gave a nonplanar triangular twisted structure, which could be thought of as a polar OCS dimer plus a C$_2$H$_2$ monomer lying above the dimer plane. In the present work, three infrared bands are analyzed. The first band clearly belongs to this previously known (OCS)$_2$-C$_2$H$_2$ complex. The second band can be assigned as an isomer of (OCS)$_2$-C$_2$H$_2$ having a similar structure, but with a nonpolar OCS dimer plus a C$_2$H$_2$ monomer above the dimer plane. The third band is assigned to OCS-(C$_2$H$_2$)$_2$. The rotational constants and dipole moment components of all three bands are consistent with barrel shape structures having $C_1$, $C_2$ and $C_3$ symmetries, respectively.