INFRARED SPECTRA OF MOLECULAR IONS PRODUCED FROM OCS AND CS$_2$ AND TRAPPED IN SOLID NEON

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When a mixture of OCS or CS$_2$ in a large excess of neon is subjected to photoionization and/or Penning ionization by a beam of excited neon atoms and then rapidly frozen at approximately 5 K, the resulting solid deposit shows infrared absorptions of both molecular cations and molecular anions. The two stretching fundamental absorptions of OCS$^+$ appear close to the gas-phase band centers, and the two stretching fundamental absorptions of OCS$^-$ are identified for the first time. Detailed isotopic substitution studies support these identifications. In the experiments on CS$_2$, the $\nu_3$ fundamental of CS$_2^+$ appears close to the gas-phase band center, and the $\nu_3$ absorption of CS$_2^-$ lies close to the position recently reported by another laboratory. The infrared absorption of CS$^+$ is also present in the spectra of Ne:CS$_2$ samples. In each of the two systems, infrared absorptions also appear which may be contributed by small concentrations of dimer ions.