INFRARED SPECTROSCOPY OF OCS ISOLATED IN SOLID PARAHYDROGEN

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The infrared spectroscopy of OCS in small parahydrogen clusters within large helium droplets and in seeded jets has received much attention recently because these systems may show evidence of superfluidity. This talk will focus on infrared spectroscopic studies of OCS in bulk solid parahydrogen crystals at liquid helium temperatures. These studies show that the OCS molecule does not rotate and only a single infrared absorption is observed in the CO stretch region at 2055.51 cm^{-1}. However, additional absorption features are observed in this region which are thought to be due to the presence of ortho-H_2 molecules in the first solvation shell of the OCS molecule. Preliminary analysis indicates that the presence of one ortho-H_2 molecule in the first solvation shell of the OCS shifts the vibrational transition frequency 0.88 cm^{-1} to the blue. The temperature dependence of the clustering with ortho-H_2 molecules is studied at various ortho-H_2 concentrations and the spectroscopic results and analysis will be presented.