INFRARED SPECTROSCOPY OF CH_3Cl-(ORTHO-H_2)$_n$ CLUSTERS IN SOLID PARAHYDROGEN

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CH_3Cl doped solid parahydrogen (p-H_2) crystals have been studied using high-resolution FT-IR. Similar to related studies of CH_3F in solid p-H_2, multiplet structures are observed in the C-Cl stretch region, which are assigned to clustering of the CH_3Cl with ortho-H_2 molecules present in the sample. In this study individual vibrational absorptions are observed for clusters in the size range of n=0-5. In contrast with the CH_3F studies,[a] at low temperature (T=1.8 K) absorptions features 2.8 cm^{-1} to the blue of the main features are observed to grow in intensity. These low temperature absorption features are believed to be due to CH_3Cl in a new structurally distinct crystal environment that must occur by reorganization of the solid hydrogen around the CH_3Cl impurity at low temperature. Experimental results and analysis will be presented to support this hypothesis.

[a] K. Yoshioka and D. T. Anderson, *J. Chem. Phys.* **119**, 4731 (2003).