

INFRARED SPECTROSCOPY OF CH₃Cl-(ORTHO-H₂)_n CLUSTERS IN SOLID PARAHYDROGEN

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CH₃Cl doped solid parahydrogen (p-H₂) crystals have been studied using high-resolution FT-IR. Similar to related studies of CH₃F in solid p-H₂, multiplet structures are observed in the C-Cl stretch region, which are assigned to clustering of the CH₃Cl with ortho-H₂ 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 CH₃F 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 CH₃Cl in a new structurally distinct crystal environment that must occur by reorganization of the solid hydrogen around the CH₃Cl impurity at low temperature. Experimental results and analysis will be presented to support this hypothesis.

^aK. Yoshioka and D. T. Anderson, *J. Chem. Phys.* **119**, 4731 (2003).