

MILLIMETER-WAVE SPECTROSCOPY OF H₂-HCl CLUSTER

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The pure rotational spectrum of the (*p*-H₂)- and (*o*-H₂)-HCl clusters for both ³⁵Cl and ³⁷Cl species have been recorded by using pulsed supersonic jet technique and millimeter-wave direct absorption spectroscopy in the 67-166 GHz region. These spectra were searched by using prediction based on the result of the infrared spectrum of the Cl-H stretching band. ^a

For (*p*-H₂)-HCl, two rotational transitions, $J = 3 - 2, 4 - 3$, in the Σ_0 ground state were observed. For (*o*-H₂)-HCl, four rotational transitions split into *l*-type doubling, $J = 2 - 1 \sim 5 - 4$, in the Π_0 ground state were observed. All of spectra were split into hyperfine structure due to Cl nucleus. The intensity of (*p*-H₂)-HCl were approximately 1 / 20 that of (*o*-H₂)-HCl. The rotational constant, B_0 , for the (*p*-H₂)-H³⁵Cl and (*o*-H₂)-H³⁵Cl were determined to be 16627.2089(20) and 16841.5120(54) MHz, respectively. The analysis of hyperfine structure and the search for rovibrational transitions of the vdW bending mode are now in progress.

^aD. T. Anderson *et al.*, *Chem. Phys.* 239, 253-269 (1998)