THE ROTATIONAL SPECTRUM OF O_2-HCl

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Rotational spectra of O_2-$H^{35}Cl$ and O_2-$H^{37}Cl$ have been studied from 3.5 to 21 GHz with an FTMW spectrometer in combination with a supersonic beam system. Several series of lines have been observed in the region. One series consists of strong lines with about 3800 MHz interval, starting at the lowest transition, J=1-0. Lines of this series have a small Zeeman effect in comparison with other series. All the observed lines have hyperfine structures caused by the quadrupole coupling of Cl and a much smaller magnetic hyperfine coupling of the proton. The molecular structure, results of *ab initio* calculations, and the rotational and hyperfine constants will be discussed.