

VIBRATIONAL PREDISSOCIATION OF THE HF-HCl COMPLEXES AT $\nu_{HF} = 3$ LEVEL

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The binary complex between HF and HCl at $\nu_{HF} = 3$ level, which has two stable forms: HF-HCl and HCl-HF, is studied recently by molecular beam laser induced fluorescence with an intracavity Ti-sapphire ring laser^a and the detection of HF $\Delta\nu = 2 \leftarrow 0$ emission. Similar to previously reported $K = 0-0$ (300000) \leftarrow (000000) transition of HF-HCl^b, the $K = 1-0$ subband seen at 11353.2 cm^{-1} shows significant rotational dependence to the predissociation linewidths, varying from 1.3 to 2.4 GHz. The rotational A constant of 43.5 cm^{-1} clearly indicates that the vibration-averaged angle between the HF axis and a -axis decreases over valence excitation, compared to 40.1 cm^{-1} at $\nu_{HF} = 1$ level. Another weaker Q-branch band observed at 11351.7 cm^{-1} , with slightly narrower linewidths and little apparent J dependence, is tentatively assigned to the $K = 1-0$ (301000) \leftarrow (000000) combination transition of HCl-HF. The 2D vibration-averaged *ab initio* interaction potential of the complex predicts the HCl-HF form becomes more stable than HF-HCl through the valence excitation. The isotopic variation^c of predissociation lifetime for the observed transitions is still under investigation.

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