

HIGH RESOLUTION INFRARED SPECTROSCOPY OF THE HCN-(*o*-H₂) AND HCN-(*p*-D₂) CLUSTERS IN THE GAS PHASE

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High resolution infrared spectra of the HCN-(*o*-H₂) and -(*p*-D₂) in the gas phase have been observed and analyzed for the first time. Spectra for the CH-stretching band were recorded by using a color center laser spectrometer combined with molecular beam optothermal detection. No spectra for HCN-(*p*-H₂) and HCN-(*o*-D₂) were observed. The observed spectra for HCN-(*o*-H₂) and (*p*-D₂) show a typical pattern for parallel band of a linear molecule. Since the *Q*-branches were absent and the *R*(0) lines were observed, these bands were assigned to $\Sigma - \Sigma$ bands. The rotational constants, B_0 , obtained from Doppler free spectra (FWHM = 20 MHz) were 0.43025(18) cm⁻¹ and 0.26630(8) cm⁻¹ for HCN-(*o*-H₂)₁ and for -(*p*-D₂)₁, respectively. For both species, the line broadening due to vibrational predissociation has not been observed. The vibrational frequencies for the vdW stretching mode were derived to be 30.2 cm⁻¹ and 28.4 cm⁻¹ for HCN-(*o*-H₂) and -(*p*-D₂), respectively.