INFRARED INTENSITY AS A SPECTRAL SIGNATURE OF H-BOND FORMATION IN SMALL AMMONIA CLUSTERS STUDIED IN HE DROPLETS

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Infrared spectra and intensities of the ν_1, ν_3 H-stretching modes of $(NH_3)_n$ clusters (n = 2-4) have been obtained using the helium droplet isolation technique. Formation of a hydrogen bond in ammonia dimers leads to an increase of the infrared intensity by about a factor of four. In the larger clusters the infrared intensity per bond is close to that of dimers and approaches the value in the NH3 crystal. Intensity of the overtone $2\nu_4$ band in trimers increases by a factor of 10 relative to that in single molecules and in dimers, and is comparable to the intensity of the ν_1, ν_3 fundamental bands in larger clusters. These results provide new insights into the hydrogen bonding in ammonia clusters.