TEMPERATURE DEPENDENCE OF THE INTENSITY OF THE VIBRATION-ROTATIONAL IR BAND ν_2 OF THE H_2O TRAPPED IN AN XENON MATRIX

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The quasi-free rotation of the small molecule in inert matrices at low temperatures attracted researchers' attention for a long time. The nature of the changing "effective" rotational constants of these molecules in different inert matrices is still rather unclear. Recently, we analyzed intensity redistribution of the vibration- rotational IR bands of the water molecule in the Ar matrix under the influence of the temperature variation in the ν_2 [1] and ν_1, ν_3 [2] spectral regions. In doing so, we have used literature experimental data. This time we performed the experimental study of the water molecule rotation in the Xe matrix at different temperatures and concentrations. The FTIR spectra were obtained in the ν_2 spectral region immediately after matrix formation and after a few hours of estimation processes of the spin relaxation. Based on the experimental data, the "effective" rotational constants in the ground and exited ν_2 vibrational states of water molecule in Xe matrix were found. The relative intensities of the components of the vibration-rotational ν_2 band were calculated at different temperatures and different ratios of the ortho- and para- water molecules. These data were compared with experimental ones.

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