

Abstract template:

Title

Rotational Structure of Water in a Hydrophobic Environment: Carbon Tetrachloride

Reference

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Authors

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Abstract

Infrared spectroscopy has been used to probe the interaction between water and the hydrophobic solvent, carbon tetrachloride. At room temperature, water exists as monomers in carbon tetrachloride, presenting a system for studying the rotational properties of water free of strong hydrogen-bonding. The rotational structure suggests a very anisotropic motion consisting of essentially free rotation about the symmetry axis and highly hindered rotation about the two perpendicular axes of the asymmetric water molecule. The rotational lifetime is significantly shortened relative to gas-phase water. An upper limit of 0.93 ps is deduced from the spectrum. Interaction with carbon tetrachloride also slightly enhances the intensity of the symmetric stretch. The results are compared with results of interactions between water and the cations Li⁺, Na⁺, K⁺, and Cs⁺. It is concluded that the attractive interaction is between the oxygen of water and the electropositive carbon of carbon tetrachloride.