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State of water in confinement near hydrophilic surfaces below the freezing temperature

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Abstract

The main goal of the research is to find a relationship between the dynamic and the structural properties of water in hydrated heterogeneous systems. The results of dielectric spectroscopy studies of hydrated matrixes of porous glasses, clays and hydrated powder of Lysozyme are presented in wide frequency and temperature intervals. It is shown that for all systems studied the low temperature relaxation process demonstrates Arrhenius kinetics and exhibits a Cole-Cole (CC) behavior. A new phenomenological approach has been recently presented (see Puzenko A, Ben Ishai P, Feldman Yu, Phys Rev Lett 105:037601, 2010) that clarifies the physical mechanism of the dipole-matrix interaction in complex systems (CS) underlying the CC behaviour. A comparison porous glass with clays helps one to understand the specific adsorbed water dynamics due to the variety in the distribution of hydration centers. © 2013 Springer Science+Business Media Dordrecht.

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