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Study of the Distribution of Organic Molecules in the Porous Space of Vycor Glasses

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Abstract

© 2014, Springer-Verlag Wien. The melting crystallization processes of cyclohexane and dimethylsulfoxide adsorbed in porous glasses Vycor have been investigated by nuclear magnetic resonance method in a wide temperature range. It has been established that the adsorbed molecules form aggregates or clusters of different sizes depending on the polarity of the adsorbed fluid. In addition, this effect leads to an inhomogeneous distribution of the adsorbed non-polar molecules in the porous volume of porous glasses Vycor. It has been shown based on the analysis of the temperature dependence of the relative proportion of the amorphous component that the molecules of the adsorbed fluid can be part of different "phases" below the melting temperature at concentration corresponding to the monolayer filling: (1) the molecules in the crystalline state, (2) the molecules in amorphous "non-frozen" layer, (3) molecules in the amorphous state on the surface which are not included in the "non-frozen" layer, and (4) the molecules in the nanopores.

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