

Colloid Journal 2010 vol.72 N5, pages 620-626

Nuclear magnetic relaxation and phase transitions of diethylene glycol in Vycor porous glasses

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Abstract

The times of longitudinal T_1 and transverse T_2 magnetic relaxation of protons of diethylene glycol in the bulk phase and in Vycor porous glasses with average pore radii of 4, 11, and 32 nm are measured by the pulse NMR method in the 172-350 K temperature range. It is found that, for all samples of porous glasses, the crystallization of diethylene glycol is not observed if its content corresponds to the monolayer surface filling. The minimum content of diethylene glycol, which makes it possible to cause its crystallization in porous glass, is determined. By analyzing the dependence of the characteristics of a component with $T_2b = 20-40 \mu s$ in the transverse magnetization decay on the content of diethylene glycol in porous glasses, the volume of nanopores comparable in size with diethylene glycol molecule is estimated. © 2010 Pleiades Publishing, Ltd.

<http://dx.doi.org/10.1134/S1061933X10050066>
