

## **Molecular exchange processes in partially filled porous glass as seen with NMR diffusometry**

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### **Abstract**

The self-diffusion properties of hexane confined in porous glass with different filling fractions were studied by means of pulsed field-gradient spin echo diffusometry. The spin echo attenuation curves were analyzed over a range of 3.5 orders of magnitude. Only for the partially filled sample was the shape of the echo attenuation curves found to depend on diffusion time. This observation indicates a vapor phase contribution to the total diffusional displacements and is interpreted by molecular exchange between the liquid and vapor phases. The distribution of molecular residence times in the liquid phase is evaluated from experimental data. A thorough analysis of this distribution function yields information about the nature of inhomogeneities of the liquid's spatial distribution inside the porous matrix, including typical sizes of the inhomogeneous regions and characteristics of exchange processes at the liquid/vapor interface. The model is further substantiated by additional computer simulations.

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