Colloid Journal 2000 vol.62 N6, pages 759-764

An Investigation of the Structure of a Porous Substance by NMR Cryodiffusometry

Filippov A., Skirda V.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Cryoporosimetry and diffusometry, along with traditional techniques, are used to determine the characteristics of porous media. In real systems characterized by a pore-size distribution and a complex geometry of the pore space, the possibilities of these methods are limited. To obtain more data on the structure of the pore space, it was suggested that these approaches be combined in a unified experimental technique called cryodiffusometry. A concept of this technique lies in the investigation of self-diffusion in liquid-containing regions in the course of sequential stepwise melting of a substance precrystallized in pores. Possibilities of cryodiffusometry were demonstrated by investigating of the pore structure of gypsum stone as an example. An analysis of the data obtained showed that pores of the sample are shaped like layers characterized by an equally probable alignment in space. The layers are longer than 40 μm and vary in thickness from 200 to more than 1000 Å; in this case, regions of different thickness are randomly distributed over the layer. The thinner the layer, the more the shape of layer portions of different thicknesses deviates from spherical.