

## Self-Diffusion in Aqueous Solutions of $\text{Al}(\text{NO}_3)_3$

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### Abstract

NMR with a pulsed-gradient magnetic field operating at the frequency of proton resonance was used to study the process of self-diffusion of water molecules in  $\text{Al}(\text{NO}_3)_3$  aqueous solutions. The characteristics of the diffusion attenuation of the spin-echo signal were used to determine the average self-diffusion coefficients and the self-diffusion coefficients for  $[\text{Al}^{3+}(\text{H}_2\text{O})_6]$ , for long-lived ion-hydrate complexes, and for water molecules not involved in these complexes. The time evolution of the shape of the spin-echo signal diffusion attenuation was used to determine the characteristic time of the main exchange process ( $8.6 \times 10^{-3}$  s), which was shown to be the process of exchange of protons between water molecules belonging to the hydrate shells of  $[\text{Al}^{3+}(\text{H}_2\text{O})_6]$  complexes and the rest of the molecules in the solution.

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