

## Measurement of the water self-diffusivity in clay gels by nuclear magnetic resonance

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Self-diffusion coefficients of water molecules in water-rich clay gels were measured by pulsed-gradient spin-echo nuclear magnetic resonance. Samples were montmorillonite, hectorite, stevensite, and expandable mica. The experimental condition was about 20-60 C and 60-100 wt%H<sub>2</sub>O. The obtained data were analyzed by a random walk model that free or unbound water diffuses in the three-dimensional porous media where obstacles (clay grains with some layers of bound water molecules) were scattered randomly. The experimental data for c.a. 85-100 wt%H<sub>2</sub>O gels were successfully explained by the model. The thickness of the bound layer was estimated to be about 1 nm for hectorite and stevensite, 4 nm for expandable mica, and 8 nm for montmorillonite.