

Diffusivity in grain boundary water estimated from grain boundary migration velocity

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Intercrystalline water can affect rheological properties of rocks. The water works as a high-diffusivity matter transport path. However, the nature of very thin water films, which exist in grain boundaries, has been poorly understood. We performed deformation experiments of wet halite rocks, and found that fluid-assisted grain boundary migration greatly weakens the strength of halite rocks. From the grain boundary migration velocity, the diffusivity in grain boundary water was estimated to be $8 \times 10^{-14-12}$ m²/s. This value is lower than the bulk water by 5-6 orders of magnitude. It should be stressed that the nature of very thin water films is essential to understanding of rheological properties of water-bearing rocks.