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Beckingham, Lauren E. / Landrot, Gautier -- 8. Resolving Time-dependent Evolution of Pore-Scale Structure, Permeability and Reactivity using X-ray Microtomography / Noiriel, Catherine -- 9. Ionic Transport in Nano-Porous Clays with Consideration of Electrostatic Effects / Tournassat, Christophe / Steefel, Carl I -- 10. How Porosity Increases During Incipient Weathering of Crystalline Silicate Rocks / Navarre-Sitchler, Alexis / Brantley, Susan L. / Rother, Gernot -- 11. Isotopic Gradients Across Fluid-Mineral Boundaries / Druhan, Jennifer L. / Brown, Shaun T. / Huber, Christian -- 12. Lattice Boltzmann-Based Approaches for Pore-Scale Reactive Transport / Yoon, Hongkyu / Kang, Qinjun / Valocchi, Albert J. -- 13. Mesoscale and Hybrid Models of Fluid Flow and Solute Transport / Mehmani, Yashar / Balhoff, Matthew T. -- 14. Reactive Interfaces in Direct Numerical Simulation of Pore-Scale Processes / Molins, Sergi

Sommario/riassunto

This RiMG (Reviews in Mineralogy & Geochemistry) volume includes contributions that review experimental, characterization, and modeling advances in our understanding of pore-scale geochemical processes. The volume had its origins in a special theme session at the 2015 Goldschmidt Conference in Prague. From a diversity of pore-scale topics that ranged from multi-scale characterization to modeling, this work summarizes the state-of-the-science in this subject. Topics include: modification of thermodynamics and kinetics in small pores. chemo-mechanical processes and how they affect porosity evolution in geological media. small angle neutron scattering (SANS) techniques. how isotopic gradients across fluid-mineral boundaries can develop and how these provide insight into pore-scale processes. Information on an important class of models referred to as "pore network" and much more. The material in this book is accessible for graduate students, researchers, and professionals in the earth, material, environmental, hydrological, and biological sciences. The pore scale is readily recognizable to geochemists, and yet in the past it has not received a great deal of attention as a distinct scale or environment that is associated with its own set of questions and challenges. Is the pore scale merely an environment in which smaller scale (molecular) processes aggregate, or are there emergent phenomena unique to this scale? Is it simply a finer-grained version of the "continuum" scale that is addressed in larger-scale models and interpretations? The scale is important because it accounts for the pore architecture within which such diverse processes as multi-mineral reaction networks, microbial community interaction, and transport play out, giving rise to new geochemical behavior that might not be understood or predicted by considering smaller or larger scales alone.

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