



*Mineralogical Society of America and Geochemical Society*  
*Short Course Announcement*



## **Pore Scale Geochemical Processes**

**Dates:** Short Course sessions are Saturday and Sunday, 15-16 August 2015, immediately before the 2015 Goldschmidt Conference, August 16-21, 2015, Prague Congress Centre, Prague, Czech Republic.

**Location:** Short Course sessions will be held at DesignHotel Elephant, Na Florenci 1412/29, CZ-110 00 Prague, Czech Republic

**Convenors:** **Carl Steefel**, Lawrence Berkeley National Laboratory, Earth Sciences Division, Mail Stop 74R316C, 1 Cyclotron Rd, Berkeley CA 94720-8266 USA [CISteefel@lbl.gov](mailto:CISteefel@lbl.gov)

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### **Short Course description:**

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? We would argue that 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.

Fortunately, the last few years have seen a marked increase in the interest in pore scale geochemical and mineralogical topics, making a *Reviews in Mineralogy and Geochemistry* volume on the subject timely. This *RiMG* volume 80 will include contributions that review experimental, characterization, and modeling advances in our understanding of pore scale geochemical processes. Characterization approaches to be considered will include X-ray synchrotron techniques, Small Angle Neutron Scattering (SANS), Backscattered Electron (BSE) mapping, and FIB-SEM mapping of pore structure. Experimental studies to be reviewed include those making use of micro-model and/or microfluidic approaches that quantify geochemical, or coupled geochemical transport processes. In addition, several of the most important pore scale modeling approaches, including Direct Numerical Simulation and Lattice Boltzmann methods, as well as the coarser-grained approaches based on pore network methods and micro-continuum models, will be reviewed. The volume will also review recent research on the pore-size dependence of reaction rates, as well as the thermodynamic and kinetic factors that influence geochemistry in nano-confined pores.

The audience for the proposed volume will be graduate students, post-doctoral associates, and professionals in the fields of geochemistry, environmental science and engineering, hydrology, and geophysics. Since the pore scale is central to many of these disciplines, we expect a wide and large audience across the Earth and Environmental sciences.

## Chapters and Authors

- Transient porosity as an integral aspect of microstructural development during fluid-mineral reaction (Andrew Putnis, University of Münster)
- Mechanisms of pore scale reaction-driven porosity and permeability generation (Bjorn Jamtveit, University of Oslo)
- Studies of multiscale porosity from Small Angle Neutron Scattering (Larry Anovitz, Oak Ridge National Laboratory)
- Effect of chemo-mechanical processes on porosity evolution (Simon Emmanuel, Hebrew University)
- Effects of nano-confinement and pore morphology kinetics and thermodynamics of confined fluids (Andrew Stack, Oak Ridge National Laboratory)
- Pore scale process coupling and apparent surface reaction rates—Effective rates in naturally heterogeneous materials (Chongxuan Liu, Pacific Northwest National Laboratory)
- Micro-continuum representations of fluid-rock interaction (Carl Steefel, Lawrence Berkeley National Laboratory)
- Resolving time-dependent evolution of porosity, permeability, and reactivity using microtomography (Catherine Noiriel, Université Paul Sabatier)
- Effect of chemical weathering on porosity evolution (Alexis Navarre-Sitchler, Colorado School of Mines)
- Transport and sorption in nano-porous clays with consideration of electrostatic effects (Christophe Tournassat, Bureau de Recherches Géologiques et Minières)
- Pore scale isotope effects—Modeling isotopic zoning in single crystals (J. Druhan, Stanford University)
- Lattice Boltzmann approaches to modeling pore scale reactive transport, with application to pore cementation (Hongkyu Yoon, Sandia National Laboratory)
- Pore network modeling of reactive transport processes (Matt Balhoff, UT Austin)
- Direct numerical simulation and upscaling of pore scale reactive transport, with application to emergent processes (permeability and reactivity change) (Sergi Molins, Lawrence Berkeley National Laboratory)

## Accompanying Meeting Session:

The short course will be held in conjunction with 2015 Goldschmidt with a GS/MSA-sponsored topical session titles *Pore Scale Geochemical Processes*, August 16-21, 2015, Prague Congress Centre, Prague 4, Czech Republic (schedule and location available at <http://goldschmidt.info/2015/index>). Abstract submission deadline: April 2, 2015. Early rate registration deadline: June 16, 2015.

## Fees:

	<i>on or before 07/01/2015</i>	<i>after 07/01/2015</i>
Professional Registration:	\$250	\$300
Student Registration:	\$120	\$170
Speaker	no cost	no cost

**Registering:** Online registration is at <https://msa.minsocam.org/shortcourses.html>. Print registration forms are also available online, and from the MSA Business Office, 3635 Concorde Pkwy Suite 500, Chantilly, VA 20151-1110 USA. phone: +1 (703) 652-9950; fax: +1 (703) 652-9951; e-mail: [jaspeer@minsocam.org](mailto:jaspeer@minsocam.org). Registration forms with payment must be returned to the MSA Business Office. Registration fees will be partially refunded if cancellation is received in writing on or before 1 July 2015. All participants and speakers must register.

**Practical:** Registration fee includes the following:

- MSA/GS short course sessions
- *Reviews in Mineralogy and Geochemistry* volume
- Meals: Morning/afternoon refreshments and lunch (Sat and Sun)

Registration fee does not include lodging, other meals not specified, or travel costs.

Recommended Hotel:

DesignHotel Elephant, Na Florenci 1412/29, CZ-110 00 Prague, Czech Republic. The hotel is offering (at least) 25 rooms at 85 Euros a night and this rate can be extended to cover the entire period of the Goldschmidt Conference. To book a room and guarantee the reduced course rate of 85 euro, please email [shefty@lbl.gov](mailto:shefty@lbl.gov) with your name, citizenship, and arrival/departure date by 1 July 2015.

