Job # 691886
Contact: Anastasia Ilgen, agilgen@sandia.gov

Description Type
What Your Job Will Be Like

The Geochemistry Department seeks a dedicated and motivated postdoctoral research scientist to investigate the effects of fluid chemistry on the nanomechanical properties of layered materials using in situ (in liquid) nanoindentation. This research program is designed to develop new fundamental understanding of the chemo-mechanical response and associated displacement bursts when stress is applied to anisotropic laminated materials. This research will build knowledge from nanomechanical measurements and slip modeling and connect these nano-scale findings to the field-scale observations. The planned experimental research will entail working with mica minerals and perovskite composites and using a Bruker Premier TriboIndenter to quantitatively connect interfacial chemical processes to nanoindentation-induced displacement bursts in layered materials. The selected applicant will perform laboratory experiments, analyze data, and write peer-reviewed publications. This position includes close collaboration with interfacial chemist, experts in nanomechanics, and statisticians. There will be opportunities to further develop various aspects of this evolving research project.
On any given day, you may be called on to:

- Design and perform nanoindentation experiments in the geochemistry laboratory
- Analyze and interpret data
- Read and summarize relevant literature
  Write manuscripts for peer-reviewed journals
- Conduct work in a multi-disciplinary team environment
- Attend and present at technical conferences or program meetings

Description Type
Qualifications We Require
PhD in mechanical engineering, geomechanics, materials science, geochemistry, chemical engineering, or a related field
Experience with nanoindentation and/or other surface measurement techniques
Experience working in a chemistry laboratory
Experience publishing in peer-reviewed journals

Description Type
Qualifications We Desire

Ability to plan and complete technical work
Experience with designing and carrying out laboratory experiments
Experience working in multi-disciplinary teams
Experience in analytical chemistry method development and optimization
Ability to understand and work with a diverse set of experimental techniques
Ability to work independently and in a team environment showing initiative and leadership
Strong written and verbal communication skills
Commitment to safety, security, and quality of research

Ability to present research findings at national and international meetings

Description Type

About Our Team

The Geochemistry Department has expertise in three areas: 1) molecular-scale modeling, 2) experimental geochemistry, and 3) applied environmental/chemical engineering. We tackle geosciences-related problems with an application for carbon sequestration, non-traditional oil and gas recovery, nuclear waste management, and environmental remediation. Many of these problems require understanding of chemical effects on mechanical properties in natural and manmade materials. This new research program is further extending out research on chemical effects on fracture, coupled chemical-mechanical effects in crystalline materials, and coupling of geochemistry and geomechanics in layered rocks (shales). Computing facilities for molecular modeling include a cluster (CPU nodes, GPU nodes) maintained by the Geochemistry Department as well as the Sandia High Performance Computing. In addition, we have 3,000 square feet of laboratory space that includes the following analytical equipment: Bruker Premier TI, Raman, XRD, FTIR, ICP-MS, ICP-OES, TOF-MS, and SEM.