



Dr. Brian Powell will collaborate on a proposal (\$6 million over five-years) funded by the Department of Energy's Office of Science, Biological and Environmental Research (BER). The project will be lead by Dr. Annie Kersting and Dr. Mavrik Zavarin at the Lawrence Livermore National Laboratory and focus on understanding the dominant geochemical processes that control plutonium transport in the environment. Plutonium geochemical behavior is influenced by complex chemical, physical, and biological processes. For example, plutonium associated with

groundwater colloids (such as nanoscale mineral particles) has been shown to facilitate accelerated transport of plutonium in groundwater. However, very little is known about the association of plutonium with these colloids. The figure demonstrates strong association of plutonium colloids associated with the iron oxyhydroxide mineral goethite. This project will provide the DOE with models which provide a scientific basis to support decisions for the remediation and long-term stewardship of contaminated legacy sites.

Drs. Ron Falta and **Larry Murdoch** were recently awarded an EPA Science to Achieve Results (STAR) grant to pursue research related to geologic sequestration of carbon dioxide (CO₂). Geologic storage of CO₂ is considered to be one of the most promising alternatives for reducing global CO₂ emissions to the atmosphere. The three-year, \$891k project, titled "Understanding and Managing Risks Posed by Brines Containing Dissolved Carbon Dioxide" involves laboratory experiments and numerical modeling to better understand the injected CO₂ behavior. This project focuses on the unique properties of CO₂ dissolved in brines at high pressures (>1000 psi). Under these conditions, the aqueous solubility of CO₂ can be 50 g/l or more. The project is a collaborative effort between Clemson University and Stanford University. The work at Stanford will be directed by Dr. Sally Benson, an adjunct faculty member in the EEES department. Benson is currently director of Stanford's Global Climate & Energy Project.

The Department of Defense (DoD) announced that the proposal entitled "Subsurface Thermal Energy Storage for Improved Heating and Air Conditioning Efficiency" submitted by **Dr. Ron Falta** (PI), **Dr. Fred Molz** along with Chuck Newell (GSI Environmental, Inc., Houston, Texas) was selected for funding. This four year project funded at \$971K will build a new generation of a geothermal heat pump system that is assisted by subsurface thermal energy storage. The project team will build this system to heat and cool a 10,000 to 20,000 ft² building at a DoD facility somewhere in the US (location to be determined).