

Measuring changes in rock: Research looks at effect of stored carbon dioxide on minerals

October 20 2010

The capture and storage of carbon dioxide in deep geologic formations, a strategy for minimizing the impacts of greenhouse gases on global warming, may currently be technologically feasible. But one key question that must be answered is the ability of subsurface materials to maintain their integrity in the presence of supercritical carbon dioxide -- a fluid state in which the gas is condensed at high temperature and pressure into a liquid.

A research team at the Pacific Northwest National Laboratory has developed tools in EMSL, a national user facility at PNNL, to study the effects of supercritical CO₂ on minerals commonly found in potential storage sites. They are presenting their results today at the AVS 57th International Symposium & Exhibition, which takes place this week at the Albuquerque Convention Center in New Mexico.

"The mechanisms of surface interactions with carbon dioxide under these conditions are unknown," says Scott Lea of PNNL. "We need to know if the carbon dioxide can dry out the clay minerals, creating cracks or have other interactions that could create pores in the rock."

Because carbon dioxide will be stored at pressures many times greater than atmospheric pressure, the integrity of the rock must be assured.

The same temperature and pressure conditions create a challenge for researchers trying to observe changes in rock samples as they occur. The PNNL group will present a high pressure atomic force microscope

(AFM) head that can integrate with existing commercial systems. The new AFM is designed to handle pressures up to 1500 psi. The presentation will show that the AFM head is capable of operating at temperatures and pressures required to maintain [carbon dioxide](#) in a supercritical state and that the noise levels are low enough to observe the atomic scale topographic changes due to chemical reactions that may occur between [mineral](#) substances and supercritical CO₂.

More information: The presentation, "Enabling the Measurement of In-Situ, Site-Specific Mineral Transformation Rates in Supercritical CO₂ through Development of a High Pressure AFM" is at 8:20 a.m. on Wednesday, October 20, 2010. ABSTRACT:

[www.avssymposium.org/Open/Search...er=IS+AS+NS+MI-WeM-2](http://www.avssymposium.org/Open/Search?search=IS+AS+NS+MI-WeM-2)

Provided by American Institute of Physics

Citation: Measuring changes in rock: Research looks at effect of stored carbon dioxide on minerals (2010, October 20) retrieved 24 April 2024 from <https://phys.org/news/2010-10-effect-carbon-dioxide-minerals.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.