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Can Geosequestration and Geothermal Energy Work Together? Enhanced Geothermal Systems Using CO₂

This study establishes a connection between geologic sequestration and enhanced geothermal systems, wherein the two practices are combined. This method not only creates storage for the excess CO₂ as the chemical reacts with surrounding rock to form a carbonate mineral, but additionally generates energy as carbon dioxide is cycled through a geothermal system. However, if carbonate precipitates build up too quickly, the system could become clogged, no longer functioning. The purpose of this experiment is to attempt to halt the geosequestric process through the addition of chemicals - in this case, sodium bisulfite. It was predicted that when sodium bisulfite is present, then the compound will create a layer of precipitate pyrite on the surface of the basalt grains that would prevent geosequestric activity. This material's presence would be determined through changes in mass, pH value, and elemental content (analyzed with an Inductively Coupled Plasma Optical Emission Spectrometer), in addition to observations under a stereoscope. Nine containers were filled with basalt and carbonated water. Sodium bisulfite was then mixed into six samples. These were then placed in an oven for two, four, or six weeks. At this time, the effects of sodium bisulfite on the sequestration process of carbon dioxide in basalt cannot be concluded. Elemental analyses of post-reacted solution and grains are required. However, the available data does show sodium bisulfite affecting pH -- the surrounding solution becomes more acidic. This could be evidence of precipitate formation. The basalt mass remains generally unchanged. Until elemental analyses have arrived, this study is not complete.