Kinetics of Pyrite Oxidation in the presence of Reducing Agents. (A05-noecker095039-Oral)

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Abstract:

Experiments to better understand the oxidation/reduction kinetics of pyrite in an oxidation reduction potential (ORP) control unit have been conducted to address the possibility of controlling a systems redox potential (Eh) with a buffered pH (using the carbonate system) and a reducing agent (increases electron activity). The relationship pe + pH can be used to describe the expected speciation with respect to the mineral in equilibrium with the system. By maintaining a constant pH and decreasing the pe (increasing electron activity), Fe(III) reduces to Fe(II) by the reaction Fe(III) + e = Fe(II). Developing the ratio of Fe(II) / Fe(III) expected in a system with pyrite oxidation, through an Eh range of -400 mV (reduced) to 400 mV (oxidized) will allow for direct comparison by species and total iron to those ratios and totals observed when reducing agents are applied to a system with a buffered pH and pyrite oxidation. Results and data from experiments run with Zn, Cr, Al, and Ca as reducing agents will be discussed.

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Presentation Information:

Presentation Date: Wednesday, November 13, 2002
Presentation Time: 2:00 pm

Keywords:

Pyrite, Kinetics , Reducing Agent, Oxidation/Reduction Potential