Armoring Processes in Passive Mine Drainage Systems. (S11-selfridge174502-Poster)

Authors:

- J.A.Selfridge West Virgina University
- L.M.McDonald West Virginia University

Abstract:

Effectiveness of passive limestone treatment systems to neutralize acid mine drainage is dependent on the dissolution rate of limestone. Limestone dissolution can be retarded by a layer of metal-hydroxides that coats the limestone surface. The coatings can be comprised of iron hydroxides, manganese hydroxides, and manganese-substituted iron hydroxides. Determination of the dissolution rate of the coated limestone under field conditions is difficult because of access, variability in the flow of water, and the heterogeneity of the mine water chemistry. Laboratory experiments were conducted to determine the disslution rate of uncoated, iron coated, manganese coated, and manganese-substituted iron coated limestone using a pH-Stat method. A calibration curve of dissolution rate vs. surface area was produced using uncoated limestone marbles with known surface area. The apparent surface area of the coated limestone was smaller than when uncoated. The relationships between the rates and the type of metal coating will be discussed.

Corresponding Author Information:

Jennifer Selfridge West Virginia University P.O. Box 6108 Morgantown, WV 26506-6108 phone: 304-293-6023 fax: 304-293-2960 e-mail: jselfrid@mix.wvu.edu

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