

Low-cost, passive treatment of dissolved metals in acid mine drainage using slow-release hydrogen peroxide

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Abstract:

Sulfur-rich, acidic wastewaters are generated world-wide from a multitude of natural and anthropogenic sources. Acid mine drainage (AMD), although naturally occurring as part of the rock weathering process, is exacerbated by large disturbances made to the earth typically involved with metal and coal mining operations. This study investigates the viability of using slow-release hydrogen peroxide (SR-HP) to oxidize and remove ferrous iron from the AMD. Fenton's reagent will form from a mixture of hydrogen peroxide and ferrous iron available from the mine drainage, creating an advanced oxidation process. Slow-release H₂O₂ (SR-HP) of variable mixing ratios will be manufactured and tested for temporal changes in release rates. Ongoing field investigations will assess the hydro-chemical and water isotopic (¹⁸O and Deuterium) characteristics of sites in detail to optimize SR-HP forms for efficiently treating ferrous iron. These forms will be installed upstream of the mine effluent, in cleaner water to prevent iron armoring, for a proof-of-concept demonstration of the efficacy of SR-HP at oxidizing dissolved iron in AMD.