

Utilization of Industrial Residuals for Prevention of Sulfide Oxidation in Mine Wastes

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Inhibition of sulfide oxidation

The subproject aims at developing techniques for prevention of sulfide oxidation in mine waste and subsequent improve leachate quality during mining operations.

Specific objectives:

- Evaluate inhibition techniques useful from economic, environmental and technical perspectives.
- Use remnants from mining and other industries in inhibition techniques.

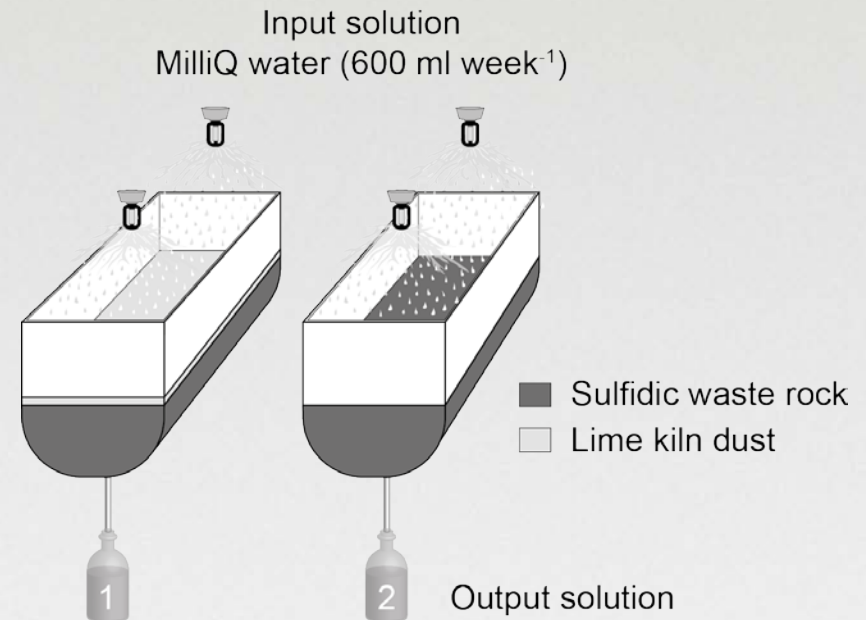
Problem

- ARD from waste rock heaps with low NNP is limed
- Application of NNP to waste rock during operation can decrease amount of NNP needed through inhibition of sulfide oxidation by formation of coatings
 - Decrease metal(loid) and sulfate release
 - Decrease cost for lime, energy, and sludge

Inhibition of sulfide oxidation

Industrial remnants/by-products are tested in laboratory and pilot scale

- Lower material cost
- Limited or no use



Results

Table 1 Average concentrations of metal(loid)s in leachate from leaching of solely waste rock as well as waste rock with addition of industrial remnants

	pH	EC (mS/cm)	As (µg/L)	Cu (µg/L)	Fe (mg/L)	Hg (µg/L)	Pb (µg/L)	S (mg/L)	Sb (µg/L)	U (µg/L)	Zn (µg/L)
Waste rock ¹	1.4	32	9526	1589	9990	5.5	567	10290	515	59	8487
LKD (5wt%) ²	7	0.77	0.18	<0.5	<0.001	<0.05	<0.02	149	3	0.13	4
Fly ash (1wt%) ³	4.6	0.51	0.12	6.5	1.9	<0.05	5.7	82	0.32	0.55	308
Fly ash (2.5wt%) ³	6.7	0.61	0.12	<0.5	1.3	<0.05	<0.02	77	2	0.82	33

¹Average concentration of 300 days (day 400-700)

²Concentration at day 700

³Concentration at day 400

Future activities

- Identify secondary minerals (coatings) formed
- Identify how and where trace elements are captured
- Determine long-term evaluation of water quality and stability of secondary minerals formed