Pilot test of pollution control and metal resource recovery for acid mine drainage

SUPPLEMENTARY MATERIAL

Cost–benefit analysis

The cost includes the depreciation of the plant, energy used, labor expenditure and transportation. Depreciation costs are more closely related to the plant scale. A plant of 5,000 m³/day has been constructed, thus this cost was calculated based on this figure. The energy used, maintenance, transportation and also the reagents used were calculated based on the pilot test. Labor expenditure was calculated with reference to running the plant.

Infrastructure cost

The cost of the infrastructure, equipment, pathway, etc. was 1.30 million USD. The design of the plant duration is 15 years, the scale was 5,000 m³/day, thus, the infrastructure cost was 0.05 USD per m³ of water disposed.

Energy used

The total electric quantity used was 3 kW/h when the flow rate was 14 m³/h, and the energy cost was 0.02 USD per m³ water disposed.

Labor expenditure

The plant was virtually automated, thus, only 15 people are employed at the pilot plant. The labor expenditure was 0.04 USD per m³ water disposed.

Figure S1 | Photograph of the main pilot structures.
Figure S2 | Photograph of each SDC surface with different retention times.
Maintenance and transportation expenditure

The maintenance and transportation expenditure for the plant was about 57,600 USD per year. It was 0.03 USD m\(^3\) water disposed.

Expenditure of reagents used

The cost of agents used was 0.41 USD per m\(^3\) of AMD.

Capital cost

Capital cost for the infrastructure included the infrastructure cost; furthermore, the tax for the metals resource was exempted by the government.

The total cost was 0.57 USD per m\(^3\) AMD, while the value of recycled metal was 0.44 USD per m\(^3\) AMD. Thus, 0.13 USD was needed for the treatment of 1 m\(^3\) of water. In contrast, the mine had to pay 0.50 USD for the treatment of 1 m\(^3\) water. Once again, the disposal of precipitates could be solved.