

EVALUATING THE RECOVERY OF IRON AND ALUMINIUM FROM ACID MINE DRAINAGE BY PRECIPITATION

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The wastes generated from both operational and abandoned coal and metal mining are an environmental concern. These wastes, including acid mine drainage (AMD), are treated to abate the devastating effects they have on the environment before disposal. The mining-metal industry and environmental agencies are aware of the opportunities to recover valuable resources from AMD to subsidize the treatment cost. This work examined the potential of recovering iron and aluminium from coal AMD by an oxidation-precipitation process. The co-precipitation of iron and aluminium was conducted at pH 5, 6 and 7 to evaluate the recovery of metals and the associated precipitate purities. The results showed that precipitation at pH 5 yielded iron and aluminium recovery of 99% and 96%, respectively. An increase in pH from 5 increased the recovery of aluminium with recoveries of 98% and 99% at pH 6 and 7, respectively. However, the precipitate purity deteriorated due to co-precipitation of other impurities. The least precipitate purity was observed at pH 7 with co-precipitation of manganese and cerium observed. Based on the results obtained, the iron and aluminium precipitate obtained at pH 5, with minimal co-precipitation of other impurities can be used in the recovery of iron and aluminium based coagulants. This process, which can easily be incorporated into existing AMD treatment plants, does not only reduce the sludge disposal problems but also creates revenue from a waste.

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