

Title: **Removal of phosphorus from sewage using basaluminite, a residue from acid mine drainage treatment.**

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Weathering of iron sulfides produces acid mine drainage (AMD) that contains high levels of sulfate, iron and other metals (Al, Cu, Cr, Pb, Zn, Cd) and metalloids such as As, which constitute a major environmental concern. Revalorization of AMD can be achieved by using the sludge produced in the passive treatment of AMD as phosphorus sorbent. The passive treatment of AMD is based on mineral precipitation by neutralization by means of limestone dissolution. One of the minerals precipitated is basaluminite, which is rich in aluminium.

Basaluminite has been synthesized and has been studied as a possible phosphorus sorbent. Batch tests were carried out to study the kinetics and the influence of pH and concentration for phosphorus adsorption. Different solid-liquid relations have been used to study the adsorption kinetics of phosphorus and the most efficient (1:1) removed 99% of the P in solution in just one hour. The effect of pH was not significant at low concentrations, but concentrations higher than 100 ppm of P, the optimal pH for phosphorus adsorption was 4. The data from the study of the influence of concentration in P sorption fitted the Langmuir model. The maximum amount of sorption capacity was 82 mg P/ g basaluminite.

The observation of the basaluminite in SEM showed a decrease of S on the surface, which can be explained by an ion exchange adsorption process of phosphates for sulphates.

The results show the potential of basaluminite to be used as a sorbent for phosphorus removal from water.