

INHIBITION OF ACID PRODUCTION IN COAL REFUSE AMENDED WITH CaSO_3 - BASED FLUE GAS DESULFURIZATION BY PRODUCTS¹

by

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Abstract: oxidation of pyrite in coal refuse produces acid which caused environmental degradation. Some flue gas desulfurization (FGD) by-products contain calcium sulfite (CaSO_3) which is a strong reductant. Calcium sulfite competes with pyrite for oxygen resulting in inhibition of pyrite oxidation. In addition fly ash, CaCO_3 and CaSO_3 in FGD can neutralize acidity. Coal refuse, amended with FGD or its components, was packed into columns (2.5 x 13 cm) and leached weekly with water for 13 weeks. The pH, titratable acidity, and concentrations of Al, As, B, Ca, Fe, Pb, S, Se, were determined. The FGD containing CaSO_3 inhibited acid production in coal refuse. The final leachate for FGD treatment had a pH of 5.3 and 20mM of acidity (hydrogen ion) as compared to a pH of 1.7 and acidity of 480 mM for the control. Compared to the control, the FGD treatment yielded lower concentrations of all elements except for B and Ca. There was an interaction between all the components in the FGD and an indication that alterations of the ratio of components in FGD may significantly improve their inhibitory effect on acid production in coal refuse.

Additional Key Words: acid mine drainage, mine reclamation, FGD, pyrite, fly ash.

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