

Raw and Calcined Magnesite and their Application in Acid Mine Drainage Neutralization

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Abstract— South Africa faces a significant and enduring challenge with acid mine drainage (AMD) discharge from decommissioned mines. This study evaluated the use of raw and calcined magnesite in the treatment of AMD. Characterization studies were done on both the AMD and the magnesite materials. Calcination studies were done by varying calcination times and temperature and AMD neutralization studies were to evaluate the effectiveness of the two magnesite materials. After treatment with raw and calcined magnesite, the AMD had a pH of 2.64 for raw magnesite and a pH of 7.17 for calcined magnesite from an initial pH of 1.65. The optimum calcination conditions were observed to be 800 °C and 60 minutes. When compared to raw magnesite, calcined magnesite is a more effective option for AMD neutralization. It can achieve a substantially higher pH, bringing the treated AMD closer to environmental compliance standards. While raw magnesite may provide some neutralization, its effectiveness in raising the pH to acceptable levels may be limited.

Keywords— Acid Mine Drainage, Calcination, Magnesite, Neutralization.

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