

Stabilization of Chromite Ore Processing Residues (COPR) Using Sodium Bisulfide

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ABSTRACT

Batch experiments were conducted to remediate chromite ore processing residues using sodium bisulfide. The COPR material was generated using the high lime/soda ash process which result in alkaline matrix with pH value of approximately 12.5. The treatment results were evaluated for particle size, pH, chemical dosage, and the mineralogical transformation of the COPR matrix. Experimental results indicated no noticeable effects due to particle size when mesh-4 or mesh-100 were used within the experimental time frame of 80 days. Higher chemical dosages resulted in better treatment results. Better treatment results were obtained when the pH of the treated material was adjusted to 9 as compared to no pH adjustment for the same chemical dosage. Experimental results also indicated that sulfide was oxidized to elemental sulfur by Cr(VI). Under open system conditions, sulfur was oxidized to sulfate which precipitated in the formation of ettringite, a swell causing mineral, at pH greater than 9. The slow dissolution of the COPR minerals caused gradual increase in pH of the treated material. Ettringite formation may prove deleterious to any COPR treatment using sulfate source if pH was not controlled below the stability region of ettringite.