PROCESSING OF BAUXITE MINE WASTE FOR METALLURGICAL APPLICATIONS

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Abstract

Increase in operating costs and environmental constraints pose challenging problems to mineral industries in general and to aluminum industry in particular. Closure of mines due to environmental problems has forced the industries to look for processing of mine wastes and old plant tails. A bauxite mine waste sample from Kolli Hills, Salem, Tamil Nadu was collected with a view to characterize and study the amenability of sample to simple processing techniques. The sample assayed 40.60% Al₂O₃, 4.70% reactive SiO₂ and 25.19% Fe₂O₃. It was yellowish to red coloured soft lump with considerable sticky fines. The specific gravity of sample was ~2.7 and bulk density was 1.4 t/m³. The sample contained mainly gibbsite with subordinate amounts of goethite and clay. Quartz, hematite, ilmenite occurred in trace amounts. Characterization and amenability test have indicated that clayey ferruginous bauxite is amenable to processing. The simple process comprising of soaking, scrubbing, wet screening over 150 micron double deck screen produced a sandy bauxite concentrate assaying 46.50% Al₂O₃, 2.59% SiO₂ [T], 1.49% reactive SiO₂ and 21.70% Fe₂O₃ with 76.8% Al₂O₃ distribution at weight % yield of 67.0. The concentrate meets the metallurgical industry requirements. The screen under size is dewatered and may find use in local pottery industry.

Keywords: Bauxite, reactive silica, processing