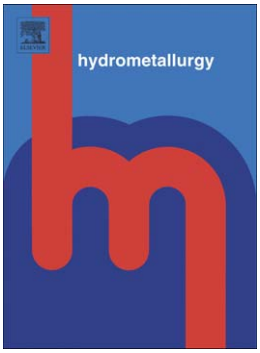

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PII: S0304-386X(15)30164-X
DOI: doi: 10.1016/j.hydromet.2015.12.010
Reference: HYDROM 4247

To appear in: *Hydrometallurgy*

Received date: 16 July 2015
Revised date: 24 November 2015
Accepted date: 16 December 2015

Please cite this article as: Xu, Dehua, Li, Huiquan, Bao, Weijun, Wang, Chenye, A new process of extracting alumina from high-alumina coal fly ash in NH_4HSO_4 + H_2SO_4 mixed solution, *Hydrometallurgy* (2015), doi: 10.1016/j.hydromet.2015.12.010

A New Process of Extracting Alumina from High-alumina Coal Fly Ash in NH_4HSO_4 + H_2SO_4 Mixed Solution

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ABSTRACT: Alumina was leached from high-alumina coal fly ash with a NH_4HSO_4 + H_2SO_4 mixed solution. The leaching behavior was systematically investigated, as were factors such as mixed solution composition and concentration, reaction time and temperature, and liquid-to-solid ratio. In optimal conditions, the alumina extraction ratios can reach 87.8%, 91.1%, and 87.5% for the three different sources of coal fly ash, respectively. The phases and morphology of the raw materials and residues were also analyzed through X-ray diffraction and scanning electron microscopy–energy dispersive spectroscopy. Results showed that mullite, which is the main form taken by alumina in high-alumina coal fly ash, can be effectively decomposed to release the alumina and induce a new amorphous silica phase in mixed solution.

Keywords: Alumina; High-alumina coal fly ash; Leaching behavior; Ammonium bisulfate; Sulfuric acid

1. Introduction

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