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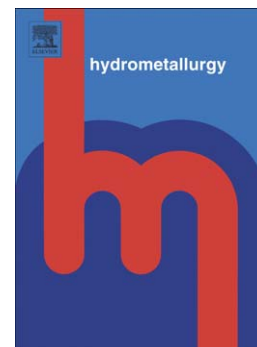
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A New Process of Extracting Alumina from High-alumina Coal Fly Ash in $\text{NH}_4\text{HSO}_4 + \text{H}_2\text{SO}_4$ Mixed Solution

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ABSTRACT: Alumina was leached from high-alumina coal fly ash with a $\text{NH}_4\text{HSO}_4 + \text{H}_2\text{SO}_4$ 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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