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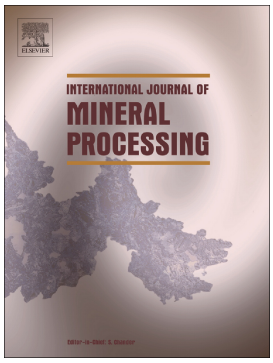

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EXTRACTION OF NICKEL AND COBALT FROM NICKELIFEROUS LIMONITIC LATERITE ORE USING BORAX CONTAINING SLAGS

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Abstract

The diminishing availability of nickel sulfide ores and the increasing demand for nickel and its compounds have led to a growing interest in laterite deposits as an alternative source for producing nickel. However, extracting nickel from laterite ores differs from sulfides because nickel contained minerals are generally disseminated throughout the ore. Laterites cannot be concentrated using classic mineral processing techniques such as flotation.

The present study proposes a new smelting process for limonitic nickeliferous laterite ore in order to separate nickel and cobalt from the ore and produce a nickel matte at lower smelting temperature compared with the current industrial techniques. The nickel and cobalt recoveries were evaluated at various flux additions. The highest recovery condition for Ni (98% Ni recovery with Ni content of 10 wt%) was achieved with the addition of 27 g of flux ($50\%Na_2CO_3 + 35\%Na_2B_4O_7.10H_2O + 15\%SiO_2$), 0.8 g coke and 5 g elemental sulfur to 25 g of the roasted ore. The above conditions led to achieving 95% Co recovery with 0.06% Co.

Keywords: Laterite; Limonitic ores; Nickel; Cobalt; Smelting; Matte