Proses reduksi selektif bijih nikel laterit kadar nikel rendah - alumina tinggi (0,5 Ni - 40 Fe -16 Al2O3 - 9,8 SiO2) dengan variasi aditif natrium sulfat, kalsium sulfat, magnesium sulfat = The selective reduction process of nickel laterite ores low nickel - high alumina (0.5 Ni - 40 Fe -16 Al2O3 - 9.8 SiO2) with variation additives sodium sulfate, calcium sulfate, magnesium sulfate

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Abstrak

Dalam proses produksi feronikel dari bijih nikel laterit diperlukan energi yang besar. Metode reduksi selektif sedang dikembangkan untuk memproses bijih nikel laterit untuk menghasilkan kadar nikel yang tinggi dan efektif tanpa memerlukan energi yang besar. Pada penelitian ini telah dipelajari proses reduksi selektif bijih nikel laterit dangan kandungan alumina tinggi menggunakannatrium sulfat, kalsium sulfat, dan magnesium sulfat sebagai aditif dengan variasi dosis 5%, 10%, dan 15% berat. Batu bara antrasit digunakan sebagai reduktor pada penelitian ini sebanyak 5% berat.

Reduksi dilakukan pada variasi temperatur 950, 1050, dan 1150^oC selama 60 menit. Proses separasi magnetik basah dengan kekuatan magnet 500 Gauss dilakukan pada tahapan setelah reduksi untuk memisahkan konsentrat (feronikel) yang bersifat magnetik dan tailing (pengotor) yang bersifat non-magnetik. Karakterisasi bijih laterit hasil reduksi dilakukan menggunakan X-ray Diffraction (XRD), mikroskop optik, dan Scanning Electron Microscope (SEM) yang dilengkapi Energy Dispersive X-ray Spectroscopy (EDS). Konsentrat dan tailing hasil separasi magnetik diidentifikasi menggunakan X-ray Fluororescene (XRF).

Hasil penelitian ini menunjukkan bahwa kadar nikel optimum didapatkan pada temperatur reduksi 1150°C dengan nilai 0,702% untuk penambahan aditif natrium sulfat; 0,757% untuk penambahan aditif magnesium sulfat; dan 0,932% untuk penambahan aditif kalsium sulfat. penambahan masing-masing aditif sebesar 15% berat.
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In the process of producing ferronickel from laterite nickel ore, a large amount of energy is needed. Selective reduction methods are being developed to process laterite nickel ore to produce high and effective nickel content without requiring large amounts of energy. In this study, the selective reduction of nickel laterite containing high alumina content has been investigated by using sodium sulfate, calcium sulfate, and magnesium sulfate as additives with varying doses of 5%, 10%, and 15% wt. Anthracite coal was used as a reducing agent in this study by 5% weight.

Reduction was conducted with variations in temperature of 950 ^oC, 1050 ^oC, dan 1150 ^oC for 60 minutes. Wet magnetic separation process with a magnetic strength of 500 Gauss is then carried out in the process after selective reduction to separate the magnetic concentrate (ferronickel) and the non-magnetic tailing (impurities). Characterization of the reduced ore laterite was

performed using X-Ray Diffraction (XRD), optical microscopy, and Scanning Electron Microscope (SEM) equipped with Energy Dispersive X-ray Spectroscopy (EDS).

The result of concentrate and tailing from magnetic separation were identified using X-ray Fluororescene (XRF). The results of this study indicate that the optimum nickel grade was obtained at a reduction temperature of 1150 °C with a value of 0.702% for the sodium sulfate additives; 0.757% for the magnesium sulfate additives; and 0.932% for the calcium sulfate additives withthe addition for each additive was 15% by weight.