

Pengaruh Basisitas Ternary pada Proses Selektif Reduksi Bijih Nikel Laterit Jenis Limonit = The Effect of Ternary Basicity on Selective Reduction Process of Limonite Nickel Ore

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Abstrak

Reduksi selektif merupakan chemical treatment yang mereduksi nikel secara selektif dan mencegah konversi material pengganggu. Banyak indikator yang mempengaruhi efektivitas reduksi, salah satunya adalah basisitas. Penelitian ini bertujuan untuk mengetahui dosis reduktor yang tepat berdasarkan stoikiometri dan pengaruh basisitas dengan penambahan CaO berdasarkan basisitas ternary. Bijih nikel laterit jenis limonit, aditif Na₂SO₄, dan reduktor batu bara bituminous 0,71%S dengan variasi stoikiometri 0,1-0,5 digerus dan dibentuk menjadi pellet berukuran 10-15mm. Proses reduksi dilakukan pada suhu 1150 dengan waktu tahan 60 menit di muffle furnace. Selanjutnya dilakukan pemisahan magnetik dan karakterisasi dengan XRF, XRD, OM. Dilakukan pencampuran bahan baku dengan CaO berdasarkan basisitas ternary B 0,1-1,0. Metode dan karakterisasi yang diterapkan sama dengan uji stoikiometri reduktor. Hasil pengujian menunjukkan stoikiometri 0,1 merupakan stoikiometri optimal. Reduktor stoikiometri 0,1 menghasilkan nikel dengan kadar 5,88% dan recovery 88,71% sedangkan besi memiliki kadar 77,06% dan recovery 33,45%. Recovery besi yang rendah mengindikasikan selektifitas reduksi terhadap nikel. Seiring meningkatnya stoikiometri reduktor kadar nikel cenderung mengalami penurunan dan terbentuk senyawa fayalit. Basisitas 0,1 adalah basisitas optimal yang menghasilkan kadar nikel 6,082% dan recovery 88,83%, besi kadar 83,779% dan recovery 40,76%. Penambahan CaO yang berlebih mengakibatkan terbentuknya senyawa kalsium silikat.

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Selective reduction is a chemical treatment that reduces nickel selectively and prevents transformation of confounding material. Many indicators affect the effectiveness of reduction, one of which is basicity. This study aims to decide the correct reducing agent dosage based on stoichiometry and the effect of basicity with the addition of CaO based on ternary basicity. Limonite nickel laterite ore, Na₂SO₄, and 0.71% S bituminous coal with stoichiometric variations of 0.1-0.5 are crushed and formed into 10-15mm pellets. The reduction process is carried out at a temperature of 1150 with a holding time of 60 minutes in the muffle furnace. Then the magnetic separation and characterization with XRF, XRD, OM were carried out. The raw material is mixed with CaO based on ternary basicity B 0.1-1.0. The method and characterization applied are the same as the reductor stoichiometry test. The results show that stoichiometry 0.1 is optimal stoichiometry and produces nickel with a grade of 5.88% and recovery of 88.71% while iron grade is 77.06% and recovery of 33.45% . Low iron recovery indicates nickel selective reduction, as stoichiometry increases the nickel grade tends to decrease and fayalite compounds are formed. Basicity 0.1 is the optimal basicity produces 6.082% nickel grade and 88.83% recovery, 83.777% iron grade and 40.76% recovery. Excessive addition of CaO results in the formation of calcium silicate compounds.</i>