# Pengaruh penambahan natrium sulfat dan sulfur terhadap reduksi karbotermik selektif ilmenit dan biomassa = The influence of sodium sulphate and sulfur addition on selective carbothermic reduction of ilmenite and biomass

Agung Setiawan, author



---

Abstrak

Penelitian ini mengkaji pengaruh penambahan natrium sulfat dan sulfur terhadap reduksi karbotermik selektif pada ilmenit dan bimomassa. Telah direduksi sebanyak tiga belas sampel dengan variasi persentase penambahan aditif dengan kenaikan 1,5%, jenis ilmenit dan lama waktu milling. Reduktor yang digunakan yaitu bimoassa dari pulverized cangkang kelapa sawit, sedangkan CMC sebagai binder. Sampel direduksi pada temperatur 120oC pada kondisi inert selama 60 menit. Berdasarkan karakterisasi XRD, diperoleh fasa dominan yaitu besi dan ferros-pseudobrookite. Hasil uji SEM memperlihatkan agregasi dan pertumbuhan partikel besi lebih baik dengan penambahan natrium sulfat daripada sulfur, dan waktu proses mechanochemical yang lama. Berdasarkan analisa Image-J diperoleh nilai tertinggi untuk luas rata-rata yaitu 73,78 mm2 pada penambahan natrium sulfat. Sedangkan nilai tertinggi dengan penambahan sulfur yaitu 36,57 mm2. Selain itu, nilai recovery dan kadar pada Fe dan Ti dibedakan pada fasa metalik dan fasa terak. Untuk nilai recovery dan kadar Ti bukan dalam bentuk logam akan tetapi dalam fasa bentuk fasa TiO2, FeTiO3, FeTi2O5, dan MgTi2O5. Pada fasa metalik, nilai tertinggi recovery (%) Fe dan Ti berturut-turut yaitu 92,82 dan 22,46. Sedangkan untuk nilai kadar (%) Fe dan Ti berturut-turut yaitu 94,20 dan 18,91. Disisi lain, pada fasa terak, nilai tertinggi recovery (%) Fe dan Ti berturut-turut yaitu 42,00 dan 98,51. Sedangkan untuk nilai kadar (%) Fe dan Ti berturut-turut yaitu 17,33 dan 70,45. .....This study examined the effect of adding sodium sulfate and sulfur to selective carbothermic reduction on ilmenite and biomass. Thirteen samples have been reduced by adding additive doses with an increase of 1.5%, ilmenite type and length of milling time. The reductors used are biomass from pulverized palm oil shell, while CMC is a binder. Samples were reduced at a temperature of 1200oC in an inert condition for 60 minutes. Based on XRD characterization, the dominant phase is iron and ferros-pseudobrookite. The SEM test results show that the aggregation and growth of iron particles is better with the addition of sodium sulfate than sulfur, and the long process time of the mechanochemical process. Based on Image-J analysis, the highest value for the average area was 73.78 mm2 for the addition of sodium sulfate. While the highest value with the addition of sulfur is 36.57 mm2. In addition, the recovery and grade in Fe and Ti are distinguished from the metallic phase and the slag phase. For recovery and grade of Ti not in metal form but in phase form phase TiO2, FeTiO3, FeTi2O5, and MgTi2O5. In the metallic phase, the highest recovery (%) in Fe and Ti were 92.82 and 22.46, respectively. Whereas for the grade (%) in Fe and Ti 94.20 and 18.91, respectively. On the other hand, in the slag phase, the best recovery (%) in Fe and Ti were 42.00 and 98.51, respectively. Whereas for the grade of (%) Fe and Ti 17.33 and 70.45, respectively.