ABSTRAK

PENGARUH VARIASI SUHU, WAKTU, DAN REAGEN PELINDIAN TERHADAP PERSEN *RECOVERY*, STRUKTUR FASA DAN MORFOLOGI BESI DARI TAILING REDUKSI LATERIT

Oleh

Haposan L. H. Sihombing

Telah dilakukan penelitian mengenai pengaruh variasi suhu, waktu, dan reagen pelindian terhadap persen *recovery*, struktur fasa, dan morfologi besi dari tailing reduksi laterit. Variasi suhu pelindian yang digunakan yaitu 30, 60, 90°C dengan variasi waktu 30 menit, 60 menit, 90 menit, dan 120 menit. Reagen yang digunakan yaitu asam sitrat ($C_6H_8O_7$) dan *monosodium glutamate* (MSG). Karakterisasi yang digunakan yaitu ICP-OES, XRD, dan FESEM-EDS. Hasil karakterisasi ICP-OES pada sampel optimal reagen asam sitrat dan MSG menghasilkan persen *recovery* Fe sebesar 77,2% dan 11,5%. Hasil karakterisasi XRD pada sampel menghasilkan puncak-puncak difraksi sesuai dengan pangkalan data standar serta terdapat fasa *wuestite* sisa pada sampel reagen asam sitrat dan fasa *quartz* sisa pengotor pada sampel reagen MSG. Hasil karakterisasi FESEM menunjukkan morfologi permukaan sampel berbentuk gumpalan tidak beraturan dan masih terdapat gumpalan yang lebih halus. Hasil EDS sampel reagen asam sitrat menunjukkan penyebaran unsur didominasi oleh unsur Fe dan Al sedangkan sampel reagen MSG didominasi oleh unsur Fe, Al, dan Si. Model kinetika pelindian yang tepat pada penelitian ini yaitu *shrinking particle model* (SPM) dan pengendali laju reaksi pelindian untuk unsur Fe dikontrol oleh difusi film gas dengan energi aktivasi ketika menggunakan reagen asam sitrat sebesar 18,98 kJ/mol dan reagen MSG sebesar 33,17 kJ/mol.

Kata Kunci: Tailing reduksi laterit, Pelindian, Karakterisasi, Model kinetika, Energi aktivasi

ABSTRACT

EFFECT OF TEMPERATURE, TIME, AND LEACHING REAGENT VARIATIONS ON PERCENT *RECOVERY*, PHASE STRUCTURE AND MORPHOLOGY OF IRON FROM LATERITE REDUCTION TAILINGS

By

Haposan L. H. Sihombing

Research has been conducted on the effect of variations in temperature, time, and leaching reagents on the percent *recovery*, phase structure, and morphology of iron from laterite reduction tailings. The leaching temperature variations use were 30, 60, 90°C with time variations of 30 minutes, 60 minutes, 90 minutes, and 120 minutes. The reagents used were citric acid ($C_6H_8O_7$) and *monosodium glutamate* (MSG). The characterizations used were ICP-OES, XRD, and FESEM-EDS. The results of ICP-OES characterization on the optimal sample of citric acid and MSG reagents resulted in Fe *recovery* percentages of 77,2% and 11,5%. The XRD characterization results on the samples produced diffraction peaks in accordance with the standard database and there was a residual *wuestite* phase in the citric acid reagent sample and a residual impurity *quartz* phase in the MSG reagent sample. The results of FESEM characterization show that the surface morphology of the sample is in the form of irregular lumps and there are still finer lumps. EDS result of citric acid reagent samples showed the distribution of elements dominated by Fe and Al elements while MSG reagent samples were dominated by Fe, Al, and Si elements. The appropriate leaching kinetics model in this study is the *shrinking particle model* (SPM) and the leaching reaction rate controller for Fe element is controlled by gas film diffusion with activation energy when using citric acid reagent of 18,98 kJ/mol and MSG reagent of 33,17 kJ/mol.

Keywords: Laterite reduction tailings, Leaching, Characterization, Kinetics model, Activation energy