Efek scale-up pada proses pelindian Bijih Nikel kadar rendah jalur hidrometalurgi = Effect process scale-up on low grade of nickel ore leaching hydrometallurgical path

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Abstrak

ABSTRAK
Bijih nikel laterit banyak tersedia di Indonesia bagian timur, seperti Pulau Sulawesi dan kepulauan Maluku termasuk pulau-pulau kecil di sekitarnya. Faktanya, sejauh ini bijih nikel kadar rendah tipe limonit belum diproses karena kandungan nikelnya sangat rendah. Dalam tesis ini kami membahas hasil terbaru pada efek scale-up dari pengolahan bijih nikel kadar rendah melalui pendekatan hidrometalurgi. Proses ini dipilih karena kandungan magnesium yang rendah dalam bijih dan konsumsi energi yang minimal selama pemprosesan. Proses yang dipilih yaitu pelindian atmosferik. Variabel-variabel proses yang dipelajari adalah persen pelarut, temperatur proses, waktu pelindian, ukuran mesh dan efek scaleup. Karakterisasi residu dipelajari dengan menggunakan SEM, XRD dan XRF. Sementara hasil proses pelindian dalam bentuk larutan dianalisis menggunakan AAS untuk menentukan fraksi elemen terlarut. Hasil penelitian saat ini menunjukkan bahwa pelindian bijih nikel kadar rendah jalur hidrometalurgi menggunakan 37% asam klorida pekat telah mengekstraksi Ni dan Fe dari bijih dengan hasil 76,7% dan 75,8%. Hal ini dicapai pada kondisi proses berikut: temperatur optimum 90oC, 200 mesh dan kecepatan pengadukan 300 rpm. Selanjutnya, pada saat bahan baku tersebut ditingkatkan hingga 100 gram limonit, hasil tersebut menurun menjadi 55% dan 65 %. Selanjutnya, terjadi penurunan hingga sekitar 45% ketika bahan baku ditingkatkan dua kali lipat menjadi 200 gram limonit.
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Abstract
The laterite nickel ores are abundantly available in the eastern part of Indonesia island like Sulawesi and Maluku islands including many small islands around them. The fact that nickel ores called limonite have not been processed so far due to the nickel content is very low. In this thesis, we discussed our recent works on the effects of scaling up of processing for low grade nickel ores through a hydrometallurgical approach. This was selected due to the low magnesium content in the ores and minimum energy consumption during processing. The selected process is the atmospheric leaching. Processing variables which were studied including the optimum percentage of solvent, processing temperatures, leaching time, mesh sizing and the scale-up effects. Characterization of the residue was studied using SEM, XRD and XRF. While the materials which

deposited in the leaching filtrate were analyzed using AAS to determine the fraction of dissolved elements. Results of current recearch work showed that leaching of low grade nickel ore using a hydrometallurgical route using 37% concentrated hydrochloric acids have resulted extracted materials of Ni and Fe with extraction yields 76.7% and 75.8% respectivelly. This was obtained at the following processing conditions: optimum temperature 90°C; 200 mesh and the stirring speed of 300 rpm. Further to this, when the feedstock was scaled up to 100 grams limonite, the yields were decreased to 55 % and 65 % for Ni and Fe respectively. A further decreased to about 45 % occurred when the feedstock was doubled to 200 grams limonite.