ABSTRAK

STUDI KOMPARATIF KARAKTERISTIK BIJIH EMAS TERHADAP PERSEN EKSTRAKSI EMAS PERAK DAN TEMBAGA DENGAN METODE *INTERMITTENT BOTTLE ROLL TEST*

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Penelitian ini bertujuan untuk mengevaluasi pengaruh karakteristik geometalurgi bijih emas terhadap perolehan ekstraksi emas (Au), perak (Ag), dan tembaga (Cu) menggunakan metode *Intermittent Bottle Roll Test* (IBRT). Penelitian dilakukan pada dua sampel bijih emas PT X dengan kondisi pelindian berupa konsentrasi NaCN 300 ppm, persen padatan 30%, temperatur 25°C, dan waktu pelindian 216 jam. Karakterisasi bijih dilakukan menggunakan *fire assay*, AAS, LECO, XRF, dan *Diagnostic Leaching Test*. Hasil karakterisasi menunjukkan bahwa Sampel A memiliki kadar Au 0,130 ppm, Ag 15,3 ppm, Cu 19 ppm, dan sulfur total 0,67%, sedangkan Sampel B memiliki kadar Au 0,332 ppm, Ag 41,5 ppm, Cu 8 ppm, dan sulfur total 0,08%. Hasil DLT menunjukkan bahwa Au pada Sampel A hanya memiliki fraksi *direct/free cyanidable* sebesar 27%, sedangkan Sampel B mencapai 71%. Pengujian IBRT menunjukkan bahwa Sampel A menghasilkan ekstraksi Au, Ag, dan Cu masing-masing sebesar 45,6%, 34,8%, dan 5,9%, sedangkan Sampel B menghasilkan ekstraksi Au, Ag, dan Cu sebesar 94,2%, 68,4%, dan 3,8%. Perbedaan ekstraksi tersebut dipengaruhi oleh distribusi keterikatan logam terhadap mineral pembawa. Sampel A didominasi oleh Au yang berasosiasi dengan mineral karbonat, arsenikal, dan sulfida piritik, sehingga menunjukkan karakter *partially refractory*. Sebaliknya, Sampel B didominasi oleh Au yang berada pada fraksi *free cyanidable* dan memiliki kandungan sulfur yang lebih rendah sehingga lebih mudah terlindi. Hasil penelitian menunjukkan bahwa distribusi keterikatan emas merupakan faktor utama yang mengendalikan keberhasilan pelindian dibandingkan kandungan sulfur total semata..

Kata kunci: *diagnostic leaching,* emas, geometalurgi, *intermittent bottle roll test*, sianidasi

ABSTRACT

Comparative Study of Gold Ore Characteristics and Their Influence on Gold Silver and Copper Extraction Using the Intermittent Bottle Roll Test

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This study aimed to evaluate the influence of gold ore geometallurgical characteristics on the extraction of gold (Au), silver (Ag), and copper (Cu) using the Intermittent Bottle Roll Test (IBRT) method. The investigation was conducted on two gold ore samples from PT X under leaching conditions of 300 ppm NaCN concentration, 30% solids, 25°C temperature, and 216 hours of leaching time. Ore characterization was carried out using fire assay, AAS, LECO, XRF, and Diagnostic Leaching Test (DLT). The characterization results showed that Sample A contained 0.130 ppm Au, 15.3 ppm Ag, 19 ppm Cu, and 0.67% total sulfur, whereas Sample B contained 0.332 ppm Au, 41.5 ppm Ag, 8 ppm Cu, and 0.08% total sulfur. DLT results indicated that only 27% of the gold in Sample A was present in the direct/free cyanidable fraction, while Sample B reached 71%. IBRT testing demonstrated that Sample A achieved Au, Ag, and Cu extractions of 45.6%, 34.8%, and 5.9%, respectively, whereas Sample B achieved 94.2%, 68.4%, and 3.8%, respectively. These differences were primarily controlled by metal deportment within the host minerals. Sample A was dominated by gold associated with carbonate, arsenical, and pyritic sulfide minerals, indicating a partially refractory character. In contrast, Sample B was dominated by gold in the free cyanidable fraction and exhibited lower sulfur content, resulting in higher leachability. The results demonstrate that gold deportment is the dominant factor controlling leaching performance, exceeding the influence of total sulfur content alone.

Keywords: cyanidation, diagnostic leaching, geometallurgy, gold, intermittent bottle roll test.