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Abstract Index

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Santoso, Binarko (R&D Centre for Mineral and Coal Technology)
Factors Controlling Petrographic Composition of Neogene Tenggarong Coals-Kutai Basin-East Kalimantan
Faktor-faktor Pengontrol Komposisi Batubara Tenggarong Neogen-Cekungan Kutai-Kalimantan Timur
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Petrographic composition of the Neogene Tenggarong coals in the Kutai Basin-East Kalimantan indicates its geological setting. The aim of this study is to obtain an understanding of the geologic aspects controlling the petrographic composition of the coals.Variation of type and rank in the coals was determined by petrographic examination of twenty-two samples. The coals are absolutely dominated by vitrinite, common liptinite and rare inertinite and mineral matter. Vitrinite macerals are dominated by detrovitrinite and telovitrinite. Cutinite and resinite are the dominant liptinite macerals in the coals. The inertinite macerals include semifusinite, inertodetrinite and sclerotinite. Clay and pyrite are the dominant mineral matters in the coals. The type differences largely reflect climatic influence and differences in peat conditions. Rank of the coals, in general, depends largely on the stratigraphic position. Reflectance measurements on the coals indicate that there is a slightly difference in rank. The coals are sub-bituminous rank ($R_v$max of 0.40-0.47%). The change in vitrinite reflectance of the coals is due to the thicker cover/overburden on the high rank coals. Nevertheless, the vitrinite reflectance is higher in some coals in the Loa Kulu area ($R_v$max of 0.48-0.57%) due to its stratigraphic position that is at the bottom of the sequence. The type and rank characteristics of the coals clearly influence the utilization. The coals are suited to utilize for direct combustion and therefore, the major utilization potential would be for power generation.

Keywords: Neogene coal, petrography, type, rank, geologic aspects

DDC 541.33598
Monika, Ika (R&D Centre for Mineral and Coal Technology)
Potential Study of Indonesia Coal for Adsorbed Natural Gas
***Studi Potensi Batubara Indonesia untuk* Adsorbed Natural Gas**
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Low rank coal was used as a precursor for the preparation of adsorbed natural gas by chemical activation with KOH-NaOH mixtures. Chemical activation process is commonly used and involves two major steps, which are heating process and chemical treatment process. The experiments were used in the various of temperatures, contact times, and rasio of sample and chemical compound. The result of process was obtained of the iodine number around of 1004 mg/g and 1198 mg/g . Based on the other study, the iodine number at 1004 mg/g and 1198 mg/g have surface area between 1000 mg/g up to 1200 mg/g. These surface area provide a methane capacity between 75 mg/g up to 80 mg/g.

Keywords: activated carbon, adsorbed natural gas, surface area, iodine number

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Handayani, Sri and Suratman (R&D Centre for Mineral and Coal Technology)
Bioleaching of Low Grade Nickel Ore Using Indigenous Fungi
Pelindian Bijih Nikel Kadar Rendah Menggunakan Jamur Indigenos
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P. 143 - 152

In this research, the biological leaching of nickel by indigenous fungi isolated from Indonesian limonite was studied to develop a feasible technique for microbial recovery of nickel from low grade nickel ore. XRD analyses indicated that goethite, alumina and quartz were major mineral composition of the ore. In the present study, isolated fungal strains having potential to solubilize nickel were characterized. that were identified as *Aspergillus sp* and *Penicillium sp* depending upon their colony morphology and microscopic studies. All microorganisms found were tested for organic acid production and leaching capabilities of nickel. Leaching experiments were performed in 250 ml Erlenmeyer flask at room temperature and 150 rpm agitation under aseptic conditions. It was observed that the *Aspergillus sp* substantially leached more nickel from limonite compared to the *Penicillium sp*. Nickel solubilization was related to pH decrease and organic acid excreted caused by growth of fungi in medium containing glucose as carbon source. The mechanisms of nickel extraction had been examined either directly or indirectly related to fungal activity. The presence of fungal cells seems to improve the leaching process. However, the use of higher pulp density resulted in a decrease of nickel solubilization. The maximum nickel recovery was 57% at 5% pulp density after 20 days of direct leaching by *Aspergillus sp*.

Keywords: bioleaching, low grade nickel ore, indigenous fungi, *Aspergillus sp, Penicillium sp*

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Suratman (R&D Centre for Mineral and Coal Technology)
Gold Recovery of Refractory Sulfide Concentrates Using Direct Cyanide Leaching with Nitrite as an Oxidant
Perolehan Emas dari Konsentrat Refraktori Sulfida dengan Sianidasi Langsung Menggunakan Oksidan Nitrit
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P. 153 - 165

The problem of refractory sulfide gold ore that has a gold recovery less than 50% when direct cyanidation applied, still exists until now. It needs oxidative pretreatment for cyanidation to be effective in gold recovery the objective of this study is figuring out the effect of sodium nitrite as an oxidizing reagent on cyanidation of refractory gold ore. Cyanide leaching of the concentrate was performed at 20%-w/w of solid (500 gram of refractory sulfide gold ore concentrate) in a 2.5-liter glass reactor with aeration and stirred at 250 rpm. Leach solutions were prepared using deionized-distilled water at the prescribed concentration of reagents. Recovery of gold increased gradually to its maximum value of 93.05% as the value of cyanide strength increased from 0.8 to 1.2% and the addition of sodium nitrite raise to 1.2 M. No improvement for further addition of nitrites. This introduction of new hydrometallurgical pre-treatment process has given more option for treating refractory ores.

Keywords: refractory gold ore, leaching, cyanide, nitrite, oxidant

DDC 330.028559832
Haryadi, Harta (R&D Centre for Mineral and Coal Technology)
Analysis of the Value-Added for Tayan Bauxite Ore and Chemical Grade Alumina
Analisis Peningkatan Nilai Tambah Penjualan Bijih Bauksit dan* Chemical Grade Alumina *Tayan
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Research conducted at PT. ANTAM and PT. ICA (Indonesia Chemical Alumina) Tayan, West Kalimantan was aimed to compare the amount of company value-added from selling the bauxite ore as a raw material and the chemical grade alumina as a processed goods. This research showed that company value added from selling 850.000 tons raw meterial US $ 8.92 million it consisted of salary and wages of US $ 692.42 thousand, royalties, CSR and insurance US $ 473.87 thousand, surveyor services US $ 150.00 thousand, other services $ 45.00 thousand, corporate income tax of US $ 1.64 million, Bank interest US $ 191.77 thousand. The company profits obtained the US $ 5, 73 million was. Of the US$ 8.92 million added value and 850.000 bauxite selling, the increase of total added value was US$ 10.49 per ton. Selling the chemical grade alumina up to 300,000 tons or equivalent to 850,000 tons provided the value -added to the US $ 57.24 million that consisted of an increase in revenue salaries and wages to US$ 3.85 million. 50.75 billion, royalties, CSR and insurance of US $ 2.49 million, surveyor services and other services US $ 16.50 million, corporate income tax $ 10.39 million, Bank interest US $ 1.21 million and corporate profits to the US $ 22.00 million. The overall value added from selling the processed goods was US$ 190.44 per ton. It is indicated that selling the chemical grade alumina provides a greater profit than that of selling the raw material.

Keywords: analysis, value-added, processing, bauxite, chemical grade alumina.

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Damayanti, Retno and Khaerunissa, Herni (R&D Centre for Mineral and Coal Technology)
Composition and Characteristics of Red Mud: A Case Study on Tayan Bauxite Residue from Alumina Processing Plant at West Kalimantan
Komposisi dan Karakteristik* Red Mud*: Studi Kasus Residu Bauksit Tayan Pabrik Pengolahan Alumina di Kalimantan Barat
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Bauxite residue emerges as the major waste material during production of alumina from bauxite by the Bayer's process. An alumina refinery built in Tayan, West Kalimantan has a aproduction capacity of 300 thousands tons per year. It means that it will produce red mud or bauxite residue approximately 300 – 350 thousands tons per year and washing residue around 200 thousand tons per year. Right now, it is stored in a nearby disposal area. This paper focuses on the characteristic study of the bauxite residue to evaluate the potential pollution risk to the surrounding environment. This experimental-based study is conducted to get appraisal and description of the residue regarding its utilization. Some characterization tests were conducted in the laboratory to find the properties of bauxite residue coupled with the previous study. It is found from the study that bauxite residue shows radioactivity elements. It comprises of oxides of iron, titanium, aluminum and silica along with some other minor constituents in the form of heavy metals and rare earth elements. Hazardous elements such as As, Pb, Cr and Hg were found in bauxite residue samples. But, the toxicity test showed that bauxite residue samples were not classified as hazardous material. Some rare earth elements such as Ga, Ce, Sc, Pr, Gd, Tb etc., were also detected in the samples.

Keywords: bauxite residue,red mud, Bayer process, alumina, heavy metals.