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Abstract Index

DDC 552

Santoso, Binarko (R&D Centre for Mineral and Coal Technology)

Petrographic Characteristics of Selected Tertiary Coals from Western Indonesia According to Their Geological Aspects

Karakteristik Petrografis Batubara Tersier Indonesia Bagian Barat Berdasarkan Aspek-Aspek Geologisnya

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P. 1 - 30

Selected Tertiary coals from the western part of Indonesia (Sumatera, Kalimantan and Java) indicate similarities and differences in type and rank characteristics. These coals reflect their geological setting, particularly for intrusive and stratigraphic aspects. Type and rank of the coals were assessed by petrographic examination. The coals are mainly dominated by vitrinite, common liptinite and rare inertinite and mineral matter. Vitrinite macerals are dominated detrovitrinite and telovitrinite. Resinite, cutinite and suberinite are the dominant liptinite macerals in the coals. Inertinite macerals in the coals consist of semifusinite, sclerotinite and inertodetrinite. The type differences largely reflect climatic influence and differences in peat conditions. In spite of short geological history, the coals exhibit variable vitrinite reflectances. The high vitrinite reflectance of the coals is a result of higher regional coalification levels in the basins associated with greater cover and effects of igneous intrusions.

Keywords: coal, maceral, type, rank, western Indonesia.

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Rodliyah, Isyatun and Rochani, Siti (R&D Centre for Mineral and Coal Technology)

Extracting Silver from Anode Slime After Lead and Gold Separations

Ekstraksi Perak dari Lumpur Anoda Setelah Pemisahan Timbal dan Emas

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P. 31 - 38

Anode slime, a byproduct from the process of copper electrorefining into the copper cathode, contains several valuable elements that can be extracted after Cu and Pb separations. Another alternative route for extracting the precious metals is still needed in terms of gaining more economical route. This research aims to seek the new route to extract the precious metals, especially silver from anode slime. In these experiments, the anode slime was obtained from PT Smelting Gresik. The lead was separated to produce the residue which was then chlorinated to extract the gold. Later the residue was used for extracting the silver by dissolving it in ammonium hydroxide solution with varying time dissolutions and concentrations and later dissolving in hydrochloric acid to form silver chloride which was reduced to metallic silver. These experiments had two trials. The first one related to directly using residual chlorination after gold separation and the second one employed the same residual chlorination but processed through de-chlorination by adding sodium carbonate. The result showed that the highest silver recovery of 53.56% related to 5 M ammonium hydroxide concentration, the temperature of 30°C, dissolution time of 60 minutes. Recovery of 53.78% was achieved at 7 M ammonium hydroxide, the temperature of 30°C, dissolution time of 60 minutes. The feed of those experiments came from direct residual chlorination, while chlorination residue that underwent de-chlorination produced silver recovery of 94.95% with leaching conditions of 5 M ammonium hydroxide, the heating temperature of 30°C and leaching time of 60 minutes. The latest recovery was relatively high resulted in the process could be scaled up to a continuous system.chlorinated to extract the gold.

Keywords: anode slime, silver recovery, silver extraction, chlorination process.

DDC 546.3

Tahli, Lili and Wahyudi, Tatang (R&D Centre for Mineral and Coal Technology)

Desorption of Gold and Silver from Activated Carbon

Desorpsi Emas dan Perak dari Karbon Aktif

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P. 39 - 47

Experiments of gold and silver elution were conducted using several parameters, either fixed or varying parameters. Ethanol volume, temperature and percent solid belonged to varying parameters while loaded carbon, stirring rate, concentrations of NaOH and NaCN served as fixed parameters. The experiment results showed that the optimum condition for such a process included 20% of ethanol volume, 80°C of temperature and solid fraction of 25%. Using such condition, the experiment was conducted for 10-hour contact time and yielded the highest desorption percentages for gold and silver, namely 80.10 and 70.73% respectively. The derived contents of gold and silver were 295.16 and 159.38 ppm while their achieved weights were 56.080 and 30.601 µ g. The fact that the achieved contents of gold and silver was close to the requirements for electrowinning process, it is suggested that the next process using a semi-continue one in terms of gaining a result that satisfies the requirement for electrowinning.

Keywords: loaded carbon, electrolyte, electrowinning, cake, bullion, gold and silver

DDC 661.03
Suratman (R&D Centre for Mineral and Coal Technology)
Distribution Characteristics of Ferro-Titanium Oxide Mineral on Low-Grade Iron Sand
Karakteristik Distribusi Mineral Besi-Titanium Oksida pada Pasir Besi Kadar Rendah
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P. 49 - 58

Iron sand is known as one of the sources of TiO_2 in the form of ilmenite or titanomagnetite mineral. Iron-titanium oxide mineral contained in Indonesia iron sand are classified as titanomagnetite. Indonesia possesses a lot of iron sand deposits such as at southern coast of Cilacap, Kebumen and other areas. The iron sand consists of magnetic and non-magnetic minerals as either loses or bound materials. Fractionation of Cilacap iron sand which employed three types of sieve (40, 60 and 80 meshes) showed that the iron sand is dominant in -40+60 fraction (68.38 g) while the most amount of iron and titania contents occurred at fraction of -80 mesh, namely 11.62 and 1.46%. Magnetic separation showed that the finer the particles and the higher the magnetic intensity, the higher the derived iron and titania. The process has also successfully increased the TiO_2 content more than 5 times, from 0.325 to 1.67%.

Keywords: iron sand, particle size, magnetic separation, titanium oxide.

DDC 669.0282
Saleh, Nuryadi; Rochani, Siti and Mamby, Hasudungan E. (R&D Centre for Mineral and Coal Technology)
Making of Iron Nugget from Concentrated Iron Sand Using Mini-Sized Rotary Kiln
Pembuatan Nuget Besi dari Konsentrat Pasir Besi Menggunakan Tungku Putar Mini
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P. 59 - 68

The availability of energy becomes a major problem in the construction of iron mineral-based smelter to produce ferrous metals in the form of pig iron. Therefore, it is necessary to develop the Krupp-Renn technology that based on coal as a reducing agent to produce pig iron in the form of nuggets. Such a technology employs a rotary kiln that consumes less energy than other furnaces. In this study, reduction process of iron sand concentrates with coal as the reductant was accomplished in a mini-sized rotary kiln (0.6 m diameter and 6 m length). The process of iron nugget making from iron sand concentrate was conducted in two (2) stages, namely oxidation and reduction processes. The former was accomplished at a temperature above 800°C for 2 (two) hours to produce hematite phase. While the later was carried out at 1250-1300°C for 6-8 hours. Both processes produced iron nuggets that contained more than 90% Fe. The highest Fe content reached 96.49% Fe. Such a nugget could meet the requirement for steel making.

Keywords: iron nugget, rotary kiln, Krupp-Renn technology, concentrated iron sand, oxidation and reduction processes.

DDC 669.0283
Amalia, Dessy; Ramanda, Yunita and Maryono (R&D Centre for Mineral and Coal Technology)
Extraction of Lead from Galena Concentrates Using Fluosilicic Acid and Peroxide
Eksraksi Timbal dari Konsentrat Galena Menggunakan Asam Fluosilikat dan Peroksida
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P. 69 - 80

A study on lead extraction from lead concentrate had been conducted. Galena is usually associated with other sulfide ores such as sphalerite.The lead concentrate was able to be extracted and purified into its metal through a leaching process using a selective solvent of fluosilicic acid (H_2SiF_6). Parameters used in this process include ratio (dose) of reactant (H_2SiF_6:H_2O_2), temperature (without heating; 30; 50; 70; 80; and 90°C) and particle size (-100+150#, -150+200#, -200+325, dan -325#).The best extraction was achieved using the particle size of -325 mesh. The amount of extracted lead was increased due to the rise of temperature and dose of fluosilicic. The amount of peroxide addition was determined by its optimum influence on the lead extraction because its excess would produce $PbSO_4$. The influence of H_2SiF_6 and H_2O_2 doses was calculated using ANOVA.

Keywords: galena, leaching, fluosilicic acid, peroxide, precipitation.