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Abstract Index

Hudaya, Gandhi K.; Soelistyohadi, Fahmi and Monika, Ika (R&D Centre for Mineral and Coal Technology)
Economic Feasibility Analysis of Coal-Based Activated Carbon Plant in Indonesia

Analisis Kelayakan Ekonomi Pabrik Karbon Aktif Berbahan Baku Batubara Skala Komersial di Indonesia
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Technology to make activated carbon from coal has been developed from laboratory to pilot plant scales with capacity of 1 ton/day. The results of previous experiments showed that the quality of coal activated carbon has complied with the standard of quality activated carbon from coconut shell (SNI). In addition, the result of coal utilization process showed that activated carbon can be used for water purification on hatchery, and waste water treatment in textiles and rubber industries. Although the technology and the quality have been reached, but for the production it still needs economic feasibility analysis. Economic feasibility analysis is necessary for coal-based activated carbon plant at commercial scale by giving an indication about economic value of the project. The indicators used in the analysis are Net Present Value (NPV), Return on Investment (ROI), Internal Rate of Return (IRR) and Payback Period. Calculation of financial indicators for the activated carbon project produced Rp 49.17 billion NPV, 50% ROI, 68,25% IRR and 1 year 4 months Payback Period. Based on that calculation, it can be concluded that the coal-based activated carbon plant would be economically feasible under certain operational scenarios. This study is expected to become an economic reference material and can attract investors to develop the commercial plant.

Keywords: coal, activated carbon, economic feasibility, commercial plant

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Development of New Equations for Gross Calorific Value of Indonesian Coals

Pengembangan Persamaan Baru untuk Menghitung Nilai Kalor Batubara Indonesia
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Numerous empirical equations have been published to correlate the gross calorific value (GCV) of coals with the result of proximate or ultimate analysis, however,

many researchers continue to propose new equations. One of the reasons is that many existing equations are likely fitted to coal of one region only. This study is aimed to evaluate the applicability of some existing equations to calculate GCV of Indonesian coal and to develop new equations that more accurate to predict the calorific value of Indonesian coal. Ten (10) new GCV formulas based on proximate analysis data of Indonesian coal were generated using SPSS software. They include three (3) equations with one independent variable, four (4) equations with two independent variables, two (2) equations with three independent variables and one (1) equation with four independent variables. The best equation has the following form: $GCV = 25.284 (M) + 30.572 (Ash) + 62.127 (VM) + 138.117 (FC) - 2890.095$. The result is in agree with previous work that equation involving four independent variables i.e. moisture (M), ash, volatile matter (VM) and fixed carbon (FC) provides the most accurate estimation of GCV. The new equation when it is used for calculating GCV of Indonesian coals gives more accurate results than that of some existing equations in the literatures.

Keywords: gross calorific value, proximate analysis, SPSS, Indonesian coal

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Development of Allothermal Gasification by a Dual Fluidized Bed Technology

Pengembangan Gasifikasi Allothermal dengan Teknologi Dual Fluidized Bed
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Allothermal gasification is a gasification process which separates oxidation process and other processes. So that, synthesis gas (syngas) could be produced from gasification with air as gasification agent. The main feature of allothermal gasification is how to transfer the heat of oxidation reaction to supply heat required for drying, pyrolysis and reduction processes. One of the techniques is to circulate bed material using a dual fluidized bed. Pressure loop and syngas composition resulted from gasification test is discussed. Pressure loop data of the Process Development Unit (PDU) facility showed a stable condition and resulted a continuous circulation of the bed material. Therefore, heat transfer of oxidation reaction into a gasifier proceeded in a continuous and stable way. A good heat transfer of the heat of oxidation reaction resulted a good quality of

syngas where the composition of H_2 was close to 50% and the ratio of H_2/CO was >2% which is suitable for chemical feedstock.

Keywords: coal gasification, allothermal, dual fluidized bed, process development unit, pressure loop, syngas

Utoyo, Harry (Geological Survey Centre)
Mineralization of the Busang Prospect, East Kalimantan

Mineralisasi Prospek Busang, Kalimantan Timur
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Busang prospect occurs in the Kalimantan Volcanic belt of East Kutai Regency, East Kalimantan. The prospect occupied the undulated morphology known as Bukit Busang. It is approximately 150 km southwest of the Kelian mine. Geologically, the Busang prospect is hosted within the volcanic rocks (tuff, breccia, dacite and andesite). The volcanic sequences are intruded by the Oligo-Miocene Atan Diorite. The hydrothermal alteration consists of silicification and argillic assemblages. Silicification is the presence of quartz and opaline silica while the argillic alteration is characterized by the presence of illite-kaolin clay. Mineralogy of the deposit comprises of gold, minor chalcopyrite, lead, sphalerite, pyrite and marcasite. Style of mineralization is quartz veins and dissemination within the host rocks. Analytical results from quartz samples show that the content of gold ranges from 0.016-66,06 ppm, Cu : 29-1810 ppm, Pb : 925-117675 ppm and Zn : 197-24908 ppm. The fluid inclusion measurement from two quartz veins indicate that the homogenization temperature ranges from 317.3-323.0°C. The fluid salinity is very low, 0.5 wt % NaCl. On the basis of mineralogy, hydrothermal alteration, quartz textures and homogenization temperature, the Busang prospect is categorized as a low sulfidation epithermal type. The genetic model of the Busang prospect is possibly due to the intrusion of the Oligo-Miocene Atan Diorite.

Keywords: Busang, geology, mineralization, genetic model, volcanic zone

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Upgrading of Tayan's Crude Bauxite Using Rotary Drum Scrubber

Peningkatan Kadar Bauksit Tayan - Kalimantan Barat, Menggunakan Drum Putar Pembersih
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Indonesia has abundant bauxite resources at Tayan, West Kalimantan, where the reserve is relied more than 800 million tons. There were two types of Tayan's bauxite that have been used in the present research. One contains 34.63 % Al_2O_3 and 5.20 % reactive SiO_2 which is known as low grade ore, while the second type contains 47.30 % Al_2O_3 and 5.79 % reactive SiO_2 which is known as high grade ore. A Rotary Drum Scrubber (diameter 80 cm, length 200 cm, screen opening 2 mm) was applied to upgrade the crude bauxite ores. The research was started by crushing followed by scrubbing and screening. The scrubber is supported by water sprayer to achieve washed bauxite (+2mm of particle sizes) separated from tailing (-2mm of particle size). The researches were conducted by varying the feed rate (300-2100 kg/hr), solid percentage (14-36%) and water flow rate (35-78 L/minute). The results show that feed rate and solid percentage have high impact to the quality of washed bauxite obtained. The higher is feed rate and solid percentage the lower is alumina content of the washed bauxite produced. An optimum condition is attained at 1600 kg/hour of feeding rate, 25% solid and 8 minutes of residence time that is capable to produce washed bauxite with chemical composition of 45.25 % Al_2O_3 and 3.27 % reactive SiO_2 (when the crude bauxite as the feed is low grade type). On the other hand, the washed bauxite obtained with chemical composition of 55.50 % Al_2O_3 , 0.47 % reactive SiO_2 and impurities content with particle sizes <2mm is approximately 2,1% (when the crude bauxite as the feed is typically high grade). The average increase of Al_2O_3 content in the washed bauxite is 6.63% and the average decrease of reactive SiO_2 is 2.87%. The washed bauxite produced is reliable as feed material for Bayer process.

Keywords: rotary drum scrubber, upgrading, bauxite, washing