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Abstract Index

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Altering Ferrous Sulphate to Synthetic Goethite
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Catalyst is required in any reaction. Coal liquefaction is one of the processes to have need of it. The most common catalyst used in the process is ferrous based catalyst. It is very influenced by pyrrhotite, which may be occurred from goethite while goethite can be composed of any iron sources. The research had the use of ferrous sulphate as the main iron source, which was reacted with caustic soda. Parameters on molar ratio of the $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}/\text{NaOH}$ were 0.2 and 0.33, reaction time applied were 3.5; 6.5 and 17.15 hours, oxygen flow rates of 100; 200; 300; 400 and 500 cc/minute were also observed. The best result was achieved at 0.2 molar ratio of the $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}/\text{NaOH}$ within 6.5 hours by oxidation process that was containing pure goethite, while 100 cc/minute of oxygen rate was enough for the process to be happened.

Keywords : ferrous sulphate, synthetic goethite, catalyst, coal liquefaction

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Study on Upgraded Low Rank Coals properties
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Upgraded brown coal (UBC) process has been discussed elsewhere. This process has been developed to produce an upgraded low rank coal with quality similar to a bituminous coal which is acceptable commercially and has low moisture content. Three Indonesian low rank coals, Berau, Tabang and Samaranggau coals were upgraded by upgraded brown coal (UBC) process to study the influence of the process on the properties of the upgraded low rank coals by conducting chemical and physical analyses such as proximate, ultimate including calorific value and equilibrium moisture, functional group of C-H and C=O, coal petrography, specific surface area and briquetability.

The result of proximate analysis indicated that the inherent moisture of the upgraded low rank coals decreased significantly compared with that of the raw coals. Hence, the calorific value of the upgraded coals

increased. The ash content of the upgraded coals was not change obviously due to that the UBC process was conducted at low temperature. However, the volatile matter content increased slightly due to the kerosene or residue that left and plugged over coal pores to prevent the reabsorption of moisture. From ultimate analyses, carbon content of the upgraded coals increased, whereas the hydrogen and oxygen contents decreased. The UBC process hardly affected the sulfur and nitrogen contents. The result of equilibrium moisture measurement showed that the moisture content of all upgraded coals were less than 9%. The functional groups of C-H and C=O of the upgraded coals were slightly less than those of the raw coals. The aromaticity of the upgraded coals were increased. The petrography of both the raw and the upgraded coals indicated that the mean vitrinite reflectance was slightly higher in the upgraded coal compared to the raw coal. There was no significant quantity and textural differences of maceral in both coals. The specific surface area of the upgraded coals was lower than that of the raw coal due to the plugging of pore structure and shrinkage by residual oil addition. The upgraded low rank coals briquette according to drop shutter and compressive strength tests indicated good characteristics of briquette.

Based on these results, UBC process only reduces the moisture content, so that the calorific value of the coal increases. Whereas the other parameters are not significantly change. UBC process does not increase the rank of the coal, therefore, it could only be applied to improve the calorific value of low rank coal which has low ash and sulfur contents.

Keywords: low rank coal, UBC, upgraded coal properties

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Geologic Factors Controlling Mineral Content in Selected Tertiary Coals - Southern Kalimantan
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Geologic aspects, particularly geologic history and depositional environment, have a main role in the distribution of mineral matter in association with maceral composition in coal. The Asem-Asem coals include Miocene and Eocene coals, which are associated with clay minerals, quartz, pyrite and carbonate. The average mean mineral content of the Miocene

coals (3.9%) is lower than that of the Eocene coals (6.7%). This indicates that the lower content reflects the balance of the subsidence rate and the peat accumulation rate during the Miocene was absolutely different from those during the Eocene. Consequently, this influenced the mineral input to the respective peats. The lower mineral content of the Miocene coals is associated with the bright lithotypes or the vitrinite-rich coals. Otherwise, the higher one of the Eocene coals is associated with dull lithotypes or the vitrinite-poor coals.

Methods applied in this study include optical microscopy (reflected-white light and fluorescence mode), X-ray diffraction and scanning electron microscopy (SEM).

Clay minerals dominated by kaolinite were deposited in a fresh water environment during peat formation. Most of the minerals are syngenetic in origin. However, some of them are considered to be epigenetic (these clays are in fissures). Quartz is mostly syngenetic, although epigenetic quartz is present. Pyrite takes place as grains and a replacement mineral in organic matter. Calcite is mostly epigenetic occurring in fractures and fissures.

Keywords: syngenetic and epigenetic minerals, geologic factors, maceral, Asem-Asem coal

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The Land Rehabilitation of Mine Out Area of Sand Quarry in Cikalahang Village, Dukuh Puntang District, Cirebon Regency
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The sand quarry activities in Cikalahang Village, District of Dukuhpuntang, Cirebon Regency had been illegally mined by hundreds of people. The land properties are owned by the Cikalahang Village. Those mine areas are close to the Telaga Remis (Remis Lake), which is administratively included in the Kuningan Regency. The existence of illegal mining has disturbed both of local government and people community. In the regional government point of view, the illegal mining will not significantly contribute to generate regional income, whilst for many people their mining activities will produce a destruction to the environment. These can be seen from the objection of the people that request the government to stop all of mine activities because of disturbance to environmental condition of the Telaga Remis (Remis Lake) as one of the water resources for the Cirebon Regency. Based on the intensity of the people requirements, the government of Cirebon Regency had decided to close all of activities of the illegal mining in those area in 2006.

According to the decision of Cirebon Regent and the Office of Environment, Forestry and Mining Cirebon Regency, it had prepared planning for rehabilitation and restoration to recover the natural and environmental capability in the mined out areas with respect to the regional spatial planning, land utilization and community demand. The intention of study is to analyse the currently condition of environment in those area including people perception and then making further evaluation to obtain the properly environmental pictures for determining the real and strategic action.

Data resources to support the study were collected through primary and secondary data. The primary data of physical-chemical component can be obtained by taking instantaneous samples of soil and surface water in the area of study. To identify the people perception, some questioners have been spreaded out to the various strata of people in order to obtain their perception and also direct interview will be applied in this study. The secondary data required for this study such as regional spatial planning, regional landuse and regional regulations will be taken from some institutions in Cirebon Regency.

Result analyses showed that the soil characteristics in mined out area were poor because of lack of nutrient and high porosity and the water of Telaga Remis and mine out area could be used as fishing cultivation and household water. The final study shows that the mined out area can potentially be developed as tourism resort in accordance with people request. The other consideration this area is adjacent to Telaga Remis with the background of the beautiful panorama of Mount Ciremai.

Keywords: land rehabilitation, illegal mining, people perception, tourism resort

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Production of Oxalic Acid by *Asoergillus Niger*
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Oxalic acid has been suggested to be essential in the metal leaching processes by *Aspergillus niger*. The ability of *Aspergillus niger* strain to produce a high amount of oxalic acid on glucose and sucrose media was investigated. The experimental results show that glucose is favorable for oxalic acid biosynthesis which can produce 14.47 g/L oxalic acid compared to 7.09 g/L oxalic acid on sucrose medium. The production pattern, however, were identical on both substrates. The main drawback of this fermentation was the low yield attained (75.47 % from theoretical yield) probably because some of glucose was oxidized to glu-

conic acid at the beginning of fermentation, and due to some limitation of growing the *A. niger* in shake flask condition because pH of the culture cannot be fully controlled in shake flask system. Therefore, batch culture in fully controlled fermentor can be carried out as further steps of experiment after shake flask.

Keywords : oxalic acid, biosynthesis, *Aspergillus niger*, glucose, sucrose

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The effect of magnetization on the leached limonitic ore

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In the viewpoint of environment preservation and efficient utilization of resources, a series process has been developed to utilize limonitic ore. Limonite is mineral content in laterite sediment with low Ni content and nickel laterite mining waste that can be an alternative

raw material of iron making due to its high iron content. Upgrading of the ore was started with magnetization using mixed carbon monoxide and carbon dioxide, methane gases, as well as coal at desired temperature, then followed by leaching of the magnetized sample in sulphuric acid media.

The result indicated that magnetization can speed up the nickel dissolution and obstruct the iron dissolution. The dissolution rate of nickel was very high in the initial period of less than 5 min, which reached almost half of the totals recoverable nickel 95% for magnetized sample compared to the untreated one which remain 5.5%. The nickel dissolution would be higher by adding the leaching time. However, leaching time would not increase the dissolution of both nickel and iron in the non-magnetized sample. Accordingly, magnetization of the ore can control the non metallic dissolution in the leaching process such as iron oxide. At the end of the leaching process, there will be iron-rich residue with minimal nickel content and nickel-rich solution.

Keywords: magnetization, limonitic ore, leaching, nickel, ironmaking