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Abstract Index

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Mineralogy Characters of Cijulang Phosphate Rocks Related to Bioleaching Process

***Karakter Mineralogi Batuan Fosfat Cijulang pada Proses* Bioleaching**

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Research on potency test of selected phosphate solubilizing microfungi (PSM) isolates had been conducted. The purpose was to obtain the most potential indigenous microfungi to solubilizing phosphate in bioleaching process. Identification with moist chamber showed that the selected PSM belonged to Penicillium genera. Bioleaching process through measuring process growth and oxalic acid production was effective on the 8^{th} day. Chemical analysis showed that bioleaching process using selected indigenous PSM of phosphate rock was able to increase P_2O_5 content from 38.40 to 49.70% or improve around 11.30%. Experimental condition for such a recovery was -140+200# of sample size an 5% of percent solid. Mineralogy characters of the leached phosphate rocks showed some micro cracks as well as encapsulation by clay minerals. Not all phosphor element was leached by oxalic acid produced by microfungi.

Keywords: phosphate rocks, phosphate solubilizing microfungi (PSM), indigenous, bioleaching, Penicillium

DDC 669.0283

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Potency of Making the Chemical Manganese Dioxide (CMD) from East Nusa Tenggara Pyrolusite

Potensi Pembuatan Mangan Dioksida dari Pirolusit Nusa Tenggara Timur

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Chemical manganese dioxide has not yet commercially developed in Indonesia. It is supplied by import sector. The fact that Indonesia has manganese resources as many as 60,893,820 tons is inconsistent with above condition. Research on CMD making employed pyrolusite as the raw material with size of -100+150 mesh. The material was then reacted with sulfuric acid 6% and various concentration of molasses as reductant from 10, 20, 30, 50 and 100 %. The manganese sulfate leachate was then purified using sodium hydroxide and then filtered to have a nonferrous manganese sulfate. The Mn was precipitated from manganese sulfate using sodium bicarbonate. The precipitated manganese carbonate was then calcined at 600°C by injecting the air at various flow rates (100, 200, 300, 400 cc/minute) and different calcination time (2, 3, 4 hours) to get manganese dioxide. The best extracted Mn reached 97.58% using 50% of molasses as a reductant. The precipitation of manganese carbonate had produced sodium carbonate as an impurity. The calcination had not yet changed the manganese carbonate into manganese dioxide due to extremely high calcination temperature.

Keywords: pyrolusite, molasses, precipitation, calcination.

DDC 691.4

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Characterization of Karangnunggal Kaolin as Raw Materials for Ceramic

Karakterisasi Kaolin Karangnunggal untuk Bahan Baku Keramik

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Kaolin from Karangnunggal had been characterized. This kaolin has a brownish white in color and is associated with tuff. To identify characteristics, the samples was analyzed by XRD, optical microscope, AAS, and SEM. The results showed that the kaolin consisted of kaolinite, halloysite, cristobalite, dickite, muscovite, illit and hematit while petrographic analysis describes halloysite, kaolinite, dickite, and quartz. SEM analysis showed the crystal forms such as kaolinite, halloysite and dickite; while chemical analysis confirmed that kaolin composition comprised SiO_2 = 65.78 %, Al_2O_3 = 19.55 %, Fe_2O_3 = 0.90 % and LOI = 8.29 %. Based on characterization results Karangnunggal kaolin originated from tuff alteration. Referring to such properties, this kaolin can be used as raw material for white ceramic products such as sanitary, ceramic tiles and insulation.

Keywords: kaolin, XRD, petrographic, SEM, chemical, utilization

DDC 540

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The Use of 1-Methyl Naphthalene as Coal Ash Removal Solvent

Penggunaan 1-Metil Naftalen sebagai Larutan Penghilang Kadar Abu dalam Batubara

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Solvent extraction method is one of the methods to reduce ash content in coal to improve the energy efficiency and reduce negative environmental impacts. The use of 1-methyl naphthalene (1-MN) as a solvent in the weight ratio of coal to solvent of 1: 3, 1: 6 and 1: 9 using three coal samples obtained from a coal washing plant, namely ROM (run of mine), DC (dirty coal) and RC (reject coal) was performed. Results show that the ash content of the extracted coals no or significantly low amount (<0.3%) ash contents. The highest extraction yield was obtained at 15.38 % (daf) at DC coal sample and coal to solvent ratio of 1:9, while the lowest at 3.09 % (daf) at ROM coal sample and coal to solvent ratio of 1:3. In addition, the extraction process with a solution of 1-MN also able to reduce moisture content of the coals, as a result the calorific value of the coals were significantly increased.

Keywords: solvent, ash, extraction yield, moisture, calorific value

DDC 541.394

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Analyzing Chemical Kinetics of Coal Gasification in Mini Gasifier Reactor

Analisis Kinetika Reaksi Gasifikasi Batubara pada Reaktor Gasifikasi Mini

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Coal gasification is a chemical reaction that has a purpose to change the original solid coal into gaseous compounds. Converting the coal into gaseous compounds will make the combustion process easier and results in increasing combustion efficiency. The sulfur and nitrogen are also easier to be separated in order to obtain cleaner flue gas. This paper presents kinetic analysis of coal gasification reactions in mini gasifier (or known as GasMin in Bahasa) reactor. The results show that the increase of the air-coal ratio (ACR) affected the maximum temperature of the reactor, which means that an increase of the intake air flow rate will increase the amount of oxygen for combustion reaction. Meanwhile, the increase of the team coal ratio (SCR) will increase flow rate of the mixture of air-steam feed. As a result, the ability of coal gasification has also increased. This will increase gasification efficiency around 3-5% which then will also increase the gas yield. The maximum value of SCR was 0.06, further than that of the yield gas and the q-value will slightly decrease. The simulation result showed that the producer gas was dominated by CO with 26.72% mole fraction; H_2 with 14.06% mole fraction, and N_2 with 47.88% mole fraction. Meanwhile CO_2, CH_4 and O_2 mole fraction were 5%, 0.24%, and 1.20% respectively.

Keywords: coal, gasification, mini gasifier, kinetic reactions.