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Sondari, Nunung (Faculty of Agriculture of Winaya Mukti University)
Effect of Bokashi Bottom Ash Dossages on the Growth of Vetiver Grass (*Vetiveria zizanioides*) and Its Lead Content
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P. 101 - 107

The experiment was conducted at a greenhouse of Agricultural Faculty of Winaya Mukti University Tanjungsari Sumedang, West Java, from May to October 2009. The objective of this research was to see the effect of the bokashi bottom ash application on the growth and of vertiver grass and its lead content. The experiment used the environmental design of Randomized Block Design (RBD) that consist of five treatments and is repeated five times. The factor was the bokashi bottom ash dosages (0,5,10, 15, and 20 t ha⁻¹). The results show that the application of bokashi bottom ash affected the growth of vetiver grass, except shoot root ratio. The dosage of 15 t ha⁻¹ presented a good effect to the plant height, the number of leaves and tillers. The bokashi bottom ash with dosage of 20 t ha⁻¹ was the best effect in absorbing lead applied to vetiver grass.

Keywords: Bottom ash, bokashi bottom ash, heavy metal Pb, vetiver grass

alic acid concentration were markedly improved (88.01% of theoretical yield and 19.52 g/L respectively). The later system gave excellent yield almost 90% of theoretical yield as a prerequisite of economical value.

Keywords: Oxalic acid, *Aspergillus niger*, temperature, nutrient feed, batch and fed batch fermentation

Wahyudi, Agus; Sariman and Rochani, Siti (R&D Centre for Mineral and Coal Technology)
Preliminary Study of Particle Size Measurement of Fine Phosphate Rocks Using Dynamic Light Scattering Method
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P. 115 - 122

Particle size measurement is an important role in the utilization of phosphate rocks for nanofertilizer. In this study, the phosphate rocks from Wonosari and Ciamis were milled by planetary ball mill (PBM) into submicron size (0.19 μm). Measurements of the submicron size were conducted using a dynamic light scattering (DLS) method, i.e. illuminating. The milled products were also compared to the milled zeolite and bentonite from the same PBM. There is a relationship between the particle milled size and its chemical composition. The correlation is interpreted as the result of different hardness in minerals content.

Keywords: phosphate rock, particle size analyzer (PSA), dynamic light scattering (DLS)

Handayani, Sri (R&D Centre for Mineral and Coal Technology)
Effect of Temperature and Nutrient Feed on the Production of Oxalic Acid by *Aspergillus Niger*
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P. 108 - 114

Oxalic acid is an important organic material used for rare earth metal extraction precipitator, metallic equipment purificant and purification of industrial minerals. *Aspergillus niger* is known to be able to produce a high concentration of oxalic acid using glucose as carbon and energy sources. For further process optimization, submerged fermentation experiments were carried out to study the effect of temperature and nutrient feed on the production of oxalic acid from medium containing glucose 35g/L. An increase in temperature process from 25 to 30°C allowed the productivity to significantly increase from 75.50 to 81.06% of theoretical yield with a final oxalic acid concentration of 17.04 g/L reached after 9 days of process. When operating at more controlled fermentor with fed-batch system, both productivity and ox-

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Leaching the Lead freom Anode Slime by Ammonium Acetate Solution
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P. 123 - 132

Selective leaching the lead from anode slime from PT. Smelting (PTS) was investigated. The presence of large amount of lead in electrometallurgical anode slime courses of extraction of precious metals (Au, Ag) and other valuable metals (Bi, Se, Te, Pt and Pd) from the slime is more difficult. A process for taking off lead content in anode slime was subjecting the latter to first and second-stage leaching in a medium of an ammo-

nium acetate solution at temperature not exceeding 80°C. Whereby lead dissolution is maximized and other metals are minimized. The effects of various parameters such as solvent concentration, leaching time, temperature, and solid/liquid ratio on the percent extraction of lead were studied. The highest recovery of lead is attained 94.9% Pb at the leaching temperature of 70°C, solvent concentration of 8 M and percent solid 20% after 120 minutes of leaching time. The leaching kinetics of lead sulfate in an ammonium acetate solution followed the ash diffusion control model and this further confirms that the activation energy of leaching is found to be 4.8 kcal/mol, to show that rate reaction can be increased by mixing.

Keywords: lead, anode slime, recovery, ammonium acetate

**Husaini; Rochani, Siti and Cahyono, Stefanus S. (1R&D Centre for Mineral and Coal Technology)
Upgrading Indonesian Bauxite by Batch Washing Method
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P. 133 - 145**

There were eight bauxite samples used in this research, three samples from Kijang contain total SiO₂ 18.36-29.16%, Al₂O₃ 40.12-48.36%, Fe₂O₃ 4.27-5.13%, one sample from Tayan, contains total SiO₂ 4.69%, Al₂O₃ 38.95%, and Fe₂O₃ 19.67 %, and four samples from Mempawah contain total SiO₂ 33.5-44.8%, Al₂O₃ 29.8-35.9%, Fe₂O₃ 7.29-9.88%. All of those bauxite ores have not fulfilled the requirement for Bayer process yet; therefore simple upgrading using a batch rotary drum scrubber is needed. The scrubbing process was carried out at varying time up to 60 minutes, 50% solid and rotary speed of 30 rpm. The bauxite was washed by the following steps: scrubbing, screening, drying, and finally it was analyzed for the chemical content. The washed bauxite produced has size fraction that is retained on the 1.7 mm of screen opening. The result of the research shows that the higher alumina content of the raw bauxite, the longer washing time is needed and the higher quality of the washed

bauxite is produced. The highest alumina content of the washed bauxite was 53.67% Al₂O₃ with the alumina recovery of 89.66% and the concentration ratio of 84.80% was achieved within 20 minutes of washing time. The washed bauxite resulted from this research is suitable as a raw material for Bayer process.

Keywords: bauxite, scrubbing, washing, washed bauxite, screening, upgrading

**Santoso, Binarko (R&D Centre for Mineral and Coal Technology)
Organic Petrology of Selected Coal Sample of Eocene Kuaro Formation from Pasir Area-East Kalimantan
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Eight samples of Eocene Kuaro Formation were taken from Pasir area, East Kalimantan to be examined their lithotype, maceral, mineral matter and rank of the coals in terms of geologic factors. The samples were analysed according to the ASTM (2009). The result shows the dominance of brighter lithotypes and vitrinite over liptinite, inertinite and mineral matter. There is a strong correlation between lithotype and maceral composition of the coals. The brighter lithotypes have high vitrinite content. This indicates that the coals were formed under a wet condition. The presence of high content of pyrite and calcite reflects marine incursion, in which the coals were deposited under paralic and shallow marine environment. Thus, this environment strongly supports the above correlation, where the coals were formed under the wet condition. The slight differences in the coal type can be caused by the relatively short period of peat accumulation and similarity in climate during the peat formation, and slight differences in geological setting during the Eocene period. Vitrinite reflectance (R_{v,max}%) values show similar ranks (mostly subbituminous A to high volatile bituminous C) with a slight difference due to the thickness of cover during the coalification.

Keywords: organic petrology, type, rank, Pasir coals