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Abstract Index

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Application of Induced Polarization (IP) Method for Identifying Metallic Mineral Distribution in the Leon Area

Aplikasi Metode Induced Polarization (IP) untuk Mengidentifikasi Penyebaran Mineral Logam di Daerah Leon

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P. 61-72

The research was conducted in the Leon area to determine the presence and quantity of metallic mineral resources. The stratigraphy of the study area is composed of alluvium and coastal deposits, Molasa Sarasin Formation, Tinombo Formation, and Intrusion. Exploration was carried out in the Leon area using Induced Polarization Method with a dipole-dipole configuration with an area of 950 m2. The length of the track is 580 meters with a North-South orientation. The number of tracks in this study was 15, with spacing electrodes as far as 20 meters and n = 1-10. The analysis showed that the distribution of resistivity values in the study area was from (13.6 to 1337) Ωm, while the chargeability values had a range of values (1.7 to 50.6) ms. The low resistivity values below 50 Ωm are interpreted as claystone to sandstone and the medium resistivity values between 50 Ωm - 500 Ωm are interpreted as compact sandstone to breccia. The resistivity values above 500 Ωm are interpreted as igneous rock. The presence of metallic minerals in the study area is characterized by changeability values above 22 ms in claystone, sandstone, breccia, and igneous rock. Calculating hypothetical resources was conducted the Block model method at Oasis Montaj that obtained 11.8 million tons of resources.

Keywords: chargeability, induced polarization, metallic minerals, resistivity.

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Impact of Blasting with Electronic Detonator Using Segmentation and Non-Segmentation Methods

Dampak Hasil Peledakan dengan Detonator Elektronik Menggunakan Metode Segmentasi dan Non-Segmentasi

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P. 73-81

Sebuku Tanjung Coal, a mining company, has a blasting location close to the building structures. This building is included in the Class 2 building on SNI 7571:2010 with a maximum peak vector sum (PVS) value of 3 mm/s or peak particle velocity (PPV) value of 3 - 7 mm/s at the frequency of 0-100 Hz. Several critical areas are located between 200 and 700 meters from the blasting location. The used initiation system is Hanwha Electronic Blasting System 2nd Generation (HEBS II), which uses HiMex 70 (emulsion) as an explosive type. In this paper, the tie-up design of blasting uses segment and non-segment methods to compare the results of blasting using the two methods. Based on 16 compared data points, the vibration results obtained using segment and non-segment had a value range of 2,767-15,102 mm/s. The average result of the digging time using the segment method is 10.9 seconds, while the non-segment method takes 10.3 seconds. The average size of fragmentation (D80) with the segment method is 49.1 cm, while the non-segment method is 45.4 cm.

Keywords: segment, non-segment, vibration, electronic detonator, blasting.

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Effect of Modifying the Heating Temperature on the Basalt Glaze Mixtures Quality for Stoneware Ceramics

Pengaruh Modifikasi Suhu Pemanasan pada Kualitas Campuran Glasir Basalt untuk Keramik Tembikar

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P. 83-91

Research has been conducted on the effect of temperature variations on basalt-based glaze mixtures for stoneware ceramic applications using temperature variations of 1100, 1200, and 1300°C. This research aims to determine the optimum temperature for the best quality basalt glaze. The glaze sample was made using raw materials of basalt, kaolin, and feldspar their composition around 60%, 10%, and 30% wts respectively performing their grain sizes under 100 mesh. Material characterization was carried out by analyzing their XRF, XRD, and optical microscopy. At a burning temperature of 1200°C, the basalt-based glaze mixture significantly influences the structure and changes of glaze on the surface of the specimen from a macro-structural perspective. At the temperature of 1200°C, the glaze layer has reached the perfect melting point and coats the specimen surface evenly and results in not easily cracked and broken. It was proven that the glaze liquid could penetrate the pores, completely covering the surface morphology of the test object. Regarding the multitude of colors formed at temperature of 1200°C, it can optimize the content of dye metals such as iron, manganese, and cobalt in the glaze materials.

Keywords: glaze, basalt, temperature variation, stoneware, coating.

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Techno-Economic of Graphite Anode Recycling Process of Electric Vehicle Lithium-Ion Batteries

Tekno Ekonomi Proses Daur Ulang Anoda Grafit Baterai Lithium-Ion Kendaraan Listrik

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P. 93-106

Graphite is the primary material for battery anodes used in electronic devices such as cell phones, laptops, and electric vehicles. Exploiting natural graphite in Indonesia is still in the exploration stage. The ever increasing demand for energy storage devices poses challenges in producing battery-grade graphite. One possible approach is to recycle the graphite anode (AG) from used Lithium-ion Batteries (LIB) into battery components. By utilizing waste as a raw material, production costs are lower as well as the use of LIB becomes more sustainable. This study discusses the techno-economics of AG recycling from electric vehicle (EV) LIBs. Secondary data is used from various research reports, journals, and books published through the official website as references and assumptions in calculations and analysis. Mechanical separation to remove plastic components, washing with organic solvents (using dimethyl carbonate-DMC) and using dimethyl carbonate (DMC) and N-methyl-2-pyrrolidone (NMP), then washing process with H_2SO_4 + H_2O_2 purifies graphite to be reused as anode material for the new LIB. Economic analysis shows that the Net Present Value is IDR 388,675,699, the Internal Rate of Return is 33.79% per year, and the Payback Period is two years and ten months. These three indicators show that the project is financially viable. The sensitivity analysis shows that it is still profitable if there is an increase in production costs of up to 20% and a decrease in selling prices of up to 20% or USD 12,000 per tonne.

Keywords: lithium-ion batteries, electric vehicle, graphite anode recycle, economic.

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Inquiring the Flyrock to Determine Minimum Safe Distance of Coal Overburden Blasting Against Residential Area

Kajian Batu Terbang untuk Menentukan Jarak Aman Minimum Peledakan Lapisan Penutup Batubara Terhadap Wilayah Permukiman

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P. 107-113

Fly rock is a rock fragmentation that is thrown as a result of blasting. Such fragmentation that is thrown beyond the specified safe distance can cause a damage to the infrastructure, mechanical equipment and humans. This study aims to determine the safe radius of the fly rock that resulting from blasting residential area which that has a distance 200-300 m and has potentially distressing to cause damage. Calculating of the flying rock throwing distance is carried out theoretically and actually with orientation to the distance between spaces, the distance between burdens, minimum stemming height, minimum hole depth, powder factor, average charge blast hole and distance initial burdens. For theoretical calculations, the save distance is calculated by empirical methods and dimensional analysis. Results of the study shows that, the maximum distance of the actual fly rock throw is 05.31 m and based on the predictions using the Cratering Method, the maximum distance of fly rocks is 172 m with a safety factor of 2 and the maximum distance of fly rocks is 199.04 m with a safety factor of 2. Based on the actual and predicted data above, it is not safe for blasting locations that is less than 200 m from residential areas, that refers to the safe radius threshold based on the regulation of the Minister of Energy and Mineral Resources No. 1827 K/30/MEM/2018.

Keywords: indigenous AMF, revegetation, root colonization, spores, sugar palm plant