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THE SEAGRASS ENERGY CONTENT IN BERAKIT AND PENGUDANG VILLAGES, BINTAN ISLAND FOR SUPPORTING THE EXISTANCES OF DUGONG (DUGONG DUGON)

Widyariset Vol. 4, No.2, November 2018, page: 113–122

Abstract

Dugong dugon is belong of the Order Sirenia, family Dugonidae, known as a seagrass specialist and been categorized into endangerd species. In Bintan Island, these animals are found in the North season (December to February). This study aims to determine the seagrass energy content as dugong food which appeared in the Berakit and Pengudang village. Collecting of seagrass biomass was conducted in May 2015. A total of 40 transects squares measuring 1 x 1 meter used to take seagrass biomass. Information about dugong at two villages were gathering thru interview. Seagrass energy content is obtained by converting biomass into energy units. The result shows that potential seagrass energy content in the Berakit village are 5.40E+11 Joule, can feed 291-498 dugong, whereas the Pengudang village are 7.22E+11 Joule can feed 196-335 dugong. The seagrass energy content derived from Halodule uninervis in Pengudang village can feed 14-24 dugong. The seagrass in both of villages have great potential for dugong feed but the anthropogenic disturbances should be considered. It is suggested that seagrass on the eastern coast of Bintan Island need to be managed seriously.

Keywords: *Seagrass energy, Halodule uninervis, Dugong dugon, Bintan island.*

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SENSITIZATION BEHAVIOR OF STAINLESS STEEL TYPE J4 DUE TO HEAT TREATMENTS

Widyariset Vol. 4, No.2, November 2018, page: 123–132

Abstract

The failure of austenitic stainless steel during the industrial aplications is place sensitization due to heat treatment. The investigation of that failure has been investigated by researchers in particular for stainless steel 2XX and 3XX types, while there isno or little investigation for stainless steel J4 type. Furthermore, the investigation of the presence of sensitization on stainlees steel was conducted by referring to American Society for Testing and Materials (ASTM) A262-02a, which the caracterization of metal surface morphologies dan chrom content used optical microscope and scanning electron microskop, and Energy-dispersive X-ray spectroscopy, respectively. The results elucidate that sensitization is produced in temperature range from 700 up to 900 °C. There isgrain boundaries attack on surface morphologies after sensitization test in the temperature range from700 up to 900 °C ,which is unlikely to happen at temperature of 600 °C. The possibility of chromium difusion to grain boundaries took place from the decrease of chromium content adjancent with grain boundaries and the increase of chromium content in

grain boundaries, which implies the formation of intermetallic compound of carbide.

Keywords: *Austenitic stainless steel, Sensitization, Heat treatment, Grain boundaries.*

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PERFORMANCE ANALYSIS OF PSO-PD CONTROLLER IN CONTROLING THE RIGID GANTRY CRANE SYSTEM

Widyariset Vol. 4, No.2, November 2018, page: 133–142

Abstract

This paper presents the particle swarm optimization (PSO) algorithm to optimize the gains of the PD controller to form what so-called the particle swarm optimization (PSO-PD) controller. The effectiveness of the proposed control algorithm is tested under constant step function and compared with Ziegler-Nichols (ZN-PD) controller. Simulation results show that proposed controller has slower rise time and peak time than ZN-PD controller as well as small overshoot under the predefned trajectories.

Keywords: *Gantry crane system*, *PSO, PD gain, Swing angle.*

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EFFECT OF NICKEL PULSED ELECTRO DEPOSITION PARAMETERS ON DEPOSIT MICROSTRUCTURE AND CORROTION RATE AISI 410 STEEL

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Abstract

Nickel pulse electrodeposition is one of the coating methods that used to increase the corrosion resistance and improve the mechanical properties. In this study, nickel was used as the anode and martensitic stainless steel 410 was used as the cathode. The solution used in the method of nickel pulse electrodeposition include nickel sulfate, nickel chloride, and boric acid. Pulse electrodeposition parameters are variation of duty cycle of 70, 80, 90% and frequency variations valued at 0.1, 1, 10, and 20 kHz. Temperatures used in research nickel pulse electrodeposition at 50 ºC, with a current density of 15 A / dm² and 18 minutes. The Scanning Electron Microscopy analysis determine the microstructure and grain size changes after a nickel pulse electrodeposition. The polarization test determine optimum rate of corrosion when 90% duty cycle and 20 kHz frequency.

Keywords: *Nickel coating, Pulse electro deposition, Stainless steel 410, Corrosion resistance, Microstructure.*

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EFFECT OF HEAT TREATMENT TEMPERATURE ON MICROSTRUCTURE CHARACTERISTIC AND HARDNESS PROPERTIES OF CASTED TI-6AL-4V ELI

Widyariset Vol. 4, No.2, November 2018, page: 153–162

Abstract

Ti-6Al-4V Extra Low Interstitial (ELI) alloys have been widely used for biomedical application as implant materials due to its excellent mechanical properties and good corrosion resistance. Furthermore, mechanical properties of this alloy could be improved by heat treatment process. In this research, it has been studied the effect of heat treatment temperature on microstructure and hardness properties of casted Ti-6Al-4V ELI alloy. After calculation of material balance to obtain this alloy composition, raw materials were melted using single arc melting furnace flowed with argon gas and melted alloy was casted. Then, it was heat treated by solution treatment for around 1

hour and subsequently quenched in water as medium. Solution temperature was given with temperature variables of 850 °C, 950 °C, and 1050 °C. After that, it was aged at temperature of 500 °C for 4 hours. Microstructures were observed using optical microscope and hardness value were obtained by Vickers hardness method. The results of microstructure observation showed that it was changed after heat treatment process, especially on morphology of α and β phase. Thus, the hardness of alloy signifcantly increased compared with as-cast condition after heat treatment process. The optimum value of hardness was obtained at temperature of 850 °C that was 478 HVN.

Keywords: *Ti-6Al-4V ELI, Solution treatment, Implant materials, Microstructure, Vickers hardness.*

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RELATIONSHIP BETWEEN FIELD WATER BALANCE WITH PRODUCTION OF BPM24 CLONE

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Abstract

In general, rubber production was influenced by fluctuation of monthly rainfall rate. This research was aimed to determine the effect of rainfall, evapotranspiration, and soil water content on the production of BPM24 rubber clone. This research was conducted at Sembawa Research Centre Experimental Field, South Sumatera, from year 2013 to 2015. The observed rubber tree was mature BPM24 clone planted on clay loam soil. Rubber productions on dry and rainy season on 2013 to 2015 were compared to determine the effect of rainfall on rubber production. The results showed that soil water content has the closest relationship on rubber production compared to rainfall and evapotranspiration parameters. Latex yield was decreased as the decrease of soil water content at dry season. Limited water on dry season was become a constraint to attain optimum rubber yield. When soil water content was droped below 100 mm, the maximum attained latex yield was 20 g/t/t.

Keywords: *BPM 24 clone, Evapotranspirasi, Water balance, Rainfall, Rubber production.*

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LOCAL MATERIAL TESTING FOR PAVEMENT MATERIAL ON REMOTE AND OUT-MOST ISLAND

Widyariset Vol. 4, No.2, November 2018, page: 173–188

Abstract

Saparua Island is one of the islands in the Central Moluccas that has a complete ecosystem, unfortunately records on mollusk research is very limited. The objectives of the study are to determine the composition, diversity, and utilization of mollusks using square transect and free collection method which conducted on April and September 2016. Water analysis is also done to determine the environmental hydrographic condition. Temperature and salinity indicate the presence of freshwater input through rivers, especially in St-2 2 (Waisisil). Concentrations of nutrients show a fairly high value, ranging from 0.001 to 0.114 mg L-1 for phosphate; 0.012-0.023 mg L -1 for nitrate; and 0.140-0.443 mg L-1 for silicate. There are 641 individual mollusks of 107 species consisting of 85 species of Gastropoda and 22 species of Bivalves. Species found mostly by Littoraria scabra (Littorinidae), Cypraea annulus (Cypreidae), Terebralia sulcata (Potamididae), Clypeomorus battilariaeformis (Cerithiidae), and Nerita chamaeleon (Neritidae). The existing mollusk community has moderate and uniform diversity with low species dominance. There are at least 35 species of mollusks that can be utilized into various commodities such as food products, accessories/decorations, and raw materials of drugs.

Keywords: *Mollusk, Diversity, Composition, Utilization.*

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SOLVENT EXTRACTION PROCESS FOR THE RECOVERY COBALT AND NICKEL FROM LOW-GRADE LATERITE USING BATCH RECYCLE SYSTEM

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Abstract

Low-grade laterite which contains nickel lower than 0.5% is diffcult to be processed using pyrometallurgy. One method which is able to solve this problem is solvent extraction. In this study, a solvent extraction process using batch recycle methods has been successfully applied to separate nickel and cobalt from low-grade laterite. Sulphuric acid was used to leach laterite at atmospheric pressure. Meanwhile, cyanex in toluene was used as an organic solvent. Taguchi experimental design has been used to analyze and optimize the solvent extraction process using batch recycle methods. Taguchi analysis results show that the optimum conditions are at 7 of pH, 3 hours of time operation, 0.9 liter/minute of flow rate and 0.75 of organic/aqueous solutions ratio.

Keywords: *Solvent extraction, Batch recycle, Laterite, Cobalt-nickel extraction, Taguchi applications.*

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THE EFFECT OF RECURRENT SINTERING ON CRYSTALLIZED AND MORPHOLOGICAL STRUCTURES Bi, Pb-Sr-Ca-Cu-O DOPED Mg

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Abstract

The synthesis of the superconducting pellets of Bi1.6Pb0.4Sr2 Ca1.8 Mg0.2Cu3O10+δ has been conducted using the solid method and repeated sintering process. The samples were analyzed using XRD (X-ray Diffractometer) and SEM-EDS (Scanning Electron Microscopy-Energy Dispersive Spectroscopy). Based on XRD analysis results, the obtained phase is (Bi,Pb)-2223, (Bi,Pb)-2212, CaPbO3,Ca2PbO4, and MgO. Recurrent sintering treatment of BPSCCO doping Mg test specimens increase the volume fraction (Bi,Pb)-2223 from 37% to 68%. Based on SEM analysis, the surface area of porosity at the surface of the test object is 4,742%. As for repeated sintering treatment resulted in a decrease of porosity from 4.742% to 2.132% to 1.589% for sintering test 1 times, 2 times, and 3 times. The grain shape is also increasingly more uniform as a result of the repeated sintering treatment given to the sample.

Keywords: *BPSCCO, Doping Mg, Volume fraksi of (Bi,Pb)-2223, Porosity, Recurrent sintering.*

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SIZE DISTRIBUTION AND CONDITION FACTOR OF SPINY LOBSTER (PANULIRUS HOMARUS LINNAEUS 1758) IN PANANJUNG PANGANDARAN

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Abstract

The waters of Pangandaran is one of area potential spread of spiny lobster in the southern of West Java. Species of spiny lobster that caught in waters Pangandaran including: Panulirus homarus, P. penicillatus, P. ornatus and P. versicolor. Measurement of spiny lobster conducted in NovemberDecember 2015 and January-February 2016 to determine the population size distribution and condition factor of spiny lobster. The result of measurement on 826 individuals spiny lobster, showed distribution size of male spiny lobster ranged from 3.1-8.9 cm (CL), while the female ranged from 3.4-8.5 cm (CL). The result of analysis of length weight relationship, spiny lobster in Pangandaran has isometric growth pattern. The values of coeffcient of fulton condition (K) and relative weight (Wr) values result of the analysis, indicating that the waters Pangandaran not quite support for the growth of spiny lobster.

Keywords: *Panulirus homarus, Isometric, Condition factor, Relative of weight, Pangandaran.*