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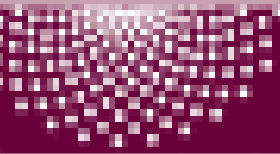

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Volume 17, Pages 1-230 (2015)

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Pages 9-15
Asep Wahyu Nugraha, Djulia Onggo, Muhamad A. Martoprawiro

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Synthesis of the Bi-doped Apatite-type Phases $La_{10-x}Bi_xSi_6O_{27}$ (x= 0.5, and 1)by Hydrothermal Method

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Pages 16-20
Atiek Rostika Noviyanti, Diana Rakhmawaty Eddy, Annisa Anshari

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Synthesis and Characterization of Hydrotalcite at Different Mg/Al Molar Ratios

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Pages 21-26
Bayu Wiyantoko, Puji Kurniawati, Tri Esti Purbaningtias, Is Fatimah

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Synthesis of Hydroxyapatite from Rice Fields Snail Shell (*Bellamya javanica*) through Wet Method and Pore Modification Using Chitosan

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Pages 27-35
Charlena, Irma Herawati Suparto, Desi Kusuma Putri

Download PDF Article preview

Preliminary Investigation of Electricity Production Using Dual Chamber Microbial Fuel Cell (DCMFC) with *Saccharomyces Cerevisiae* as Biocatalyst and Methylene Blue as an Electron Mediator

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Pages 36-43
Dani Permana, Desi Rosdianti, Safri Ishmayana, Saadah D. Rachman, ... Hari Rom Hariyadi

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The Olefin Reaction between Crude Palm Oil Fatty Acid Methyl Ester (CPO FAME) and Ethylene Using Grubbs II Catalyst

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Synthesis of Trypsin-modulating Oostatic Factor (TMOF) and its Analogues by Solid-phase Peptide Synthesis Using DIC/Oxyma as Coupling Reagent

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Pages 125-131

Rani Maharani, Eka Fitri Yanti, M.Devia Irma Melati, Daniel Sihotang

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Au(III) Selective Adsorption of Quaternary Ammonium-Silica Hybrid in Au/Cu System

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Pages 132-138

Reni Banowati Istiningrum, Christny Desiree Tiwow, Nuryono, Narsito

Download PDF Article preview

Synthesis and Characterization of Gadolinium Diethylenetriamine Pentaacetate-Folate

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Pages 139-146

R.P. Fauzia, A. Mutalib, R.U.M.S. Soedjanaatmadja, H.H. Bahti, ... Y. Hidayati

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Antioxidant and α-Glucosidase Inhibitory Compounds of *Centella Asiatica*

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Pages 147-152

Rizna Triana Dewi, Faiza Maryani

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Optimization in Mediated Electrochemical Oxidation Using Cobalt Sulfate as a Mediator

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Pages 153-156

Rubianto Abd. Lubis, Husein H. Bahti, Iwan Hastiawan, Dennis Mulcahy

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Procedia Chemistry 17 (2015) 36 – 43

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Preliminary Investigation of Electricity Production Using Dual Chamber Microbial Fuel Cell (DCMFC) with *Saccharomyces cerevisiae* as Biocatalyst and Methylene Blue as an Electron Mediator

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Abstracts

Microbial fuel cell (MFC) is one of promising fuel cell technologies. MFC utilizes biochemical activity of microorganism to convert the substrate to produce electricity through metabolism processes. Although the generation of the electricity is still in mW scale, MFCs has a great potential for the future application. The aim of this study was to investigate the performance of MFCs with and without the methylene blue (MB) as an electron mediator utilizing *Saccharomyces cerevisiae* as biocatalysts and glucose as substrate to generate electricity. Methods performed comprise of the *S. cerevisiae* yeast culture rejuvenation, preparation of the inoculum, preparation of the MFC reactor, preparation of MFC medium with 2% of glucose with and without MB mediator, periodical sampling, determination of growth curve, measurement of current, potential, calculation of power density, energy, glucose consumption, and production of bioethanol. MFC with mediator generated 5.5×10^{-5}A of current, 0.886 V of potential, 4.48×10^{-3} W/m^2 of power density, 4.14×10^{-3} J of energy, 95.0% of glucose consumption and 0.74% (v/v) of bioethanol produced during the MFC process, while MFC without mediator generated 4.5×10^{-5} A of current, 0.689 V of potential, 2.12×10^{-3} W/m^2 of power density, 1.96×10^{-3} J of maximum energy, 96.3% of glucose consumption and 0.74 % (v/v) of bioethanol produced. Power density yields from both type of MFC are still very low and not differ significantly. From the present study, it can be concluded that MB mediator only effected on potential yield in MFC using the condition applied in this study.

Keywords: Dual chamber microbial fuel cell; electricity; methylene blue; *Saccharomyces cerevisiae*

1. Introduction

Microbial fuel cell (MFC) is a bioelectrochemical cell which utilizes electrogenic bacteria to oxidize a variety of substrates including acetate[1], glucose[2], volatile fatty acids[3]. and inorganic substances such as sulfides[4] and nitrite[5], to form electrical current. Through the oxidation process electrons and protons are generated at anode and recombined at the cathode to produce water[6,7].

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