C-6

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : PROSIDING

Judul Artikel Ilmiah	:	TiO2-M self-cleaning coating with antimicrobial and superhydrophilic properties		
Penulis Artikel Ilmiah	:	Rizgyandhaka Artha Prawira, **Dessy Ariyanti**		
Status Pengusul	:	Penulis utama		
Identitas Prosiding	:	a. Nama Prosiding	:	Materials today: Proceedings
		b. Nomor ISSN/ISBN	:	22147853
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		g. Jumlah halaman	:	8 halaman
		h. Terindeks di (jika ada)	:	SCOPUS SJR 0,34
		j. Turnitin	:	https://doc-pak.undip.ac.id/13914/3/Turnitin-C6.pdf

Kategori Publikasi (beri ✓ pada kategori yang tepat) :
- [✓] Seminar Internasional Terindeks (Scopus)
- [ ] Seminar Internasional Tidak Terindeks
- [ ] Seminar Nasional

I. Hasil Penilaian *Peer Review* :

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		Reviewer I	Reviewer II	Nilai Rata-Rata
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b.	Ruang lingkup dan kedalaman pembahasan (30%)	8,00	8,50	8,25
c	Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	8,00	8,00	8,00
d.	Kelengkapan unsur dan kualitas penerbit (30%)	8,00	8,50	8,25
Nilai Total = (100%)		**27,00**	**27,50**	**27,25**
Nilai pengusul = (0,4 x nilai total)		**10,8**	**11,00**	**10,90**

Semarang,

Penilai 1

Prof.Dr.Ir. Bakti Jos, DEA
NIP 196005011986031003
Unit kerja : Teknik Kimia FT Undip

Penilai 2

Prof. Dr. Ir. Hadiyanto, S.T., M.Sc., IPU
NIP 197510281999031004
Unit kerja : Teknik Kimia FT Undip

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I. Hasil Penilaian *Peer Review* :

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		Seminar Internasional Terideks	Seminar Internasional Tidak Terideks	Seminar Nasional	
		30			
a.	Kelengkapan dan Kesesuaian unsur isi artikel (10%)	3			3,0
b.	Ruang lingkup dan kedalaman pembahasan (30%)	9			8,0
c.	Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9			8,0
d.	Kelengkapan unsur dan kualitas penerbit (30%)	9			8,0
Nilai Total = (100%)		**30**			**27,0**
Nilai pengusul =				**40%x 27**	**10,8**

KOMENTAR/ULASAN PEER REVIEW

Kelengkapan dan Kesesuaian Unsur	:	Kelengkapan unsur artikel sudah lengkap mulai terdapat abstract, introduction, experimental methods, results and discussion, conclusions dan references. Tingkat plagiasi artikel ini sebesar 11% dan sudah memenuhi syarat (<25%).
Ruang Lingkup dan Kedalaman Pembahasan	:	Tingkat kedalaman pembahasan cukup, 51% dari referensi digunakan dalam pembahasan. Ruang lingkup karya ilmiah sesuai dengan bidang penulis.
Kecukupan & Kemutakhiran Data & Metodologi	:	Referensi yang digunakan sudah cukup banyak, namun dari 37 referensi masih ada 1 referensi yang lebih dari 10 tahun terakhir. Metodologi penelitian yang disampaikan cukup jelas dan lengkap.
Kelengkapan Unsur dan Kualitas Penerbit	:	Terbitan lengkap memuat informasi volume, tahun dan halaman. Artikel ini diterbitkan dalam prosiding yang terindeks SCOPUS dengan nilai SJR 0,34.

Semarang,
Penilai 1

Prof.Dr.Ir. Bakti Jos, DEA
NIP 196005011986031003
Unit kerja : Fakultas Teknik
Bidang Ilmu : Teknik Kimia
Jabatan/Pangkat : Guru Besar

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		g. Jumlah halaman	:	8 halaman
		h. Terindeks di (jika ada)	:	SCOPUS SJR 0,34
		j. Turnitin	:	https://doc-pak.undip.ac.id/13914/3/Turnitin-C6.pdf

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I. Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai		Nilai Maksimal Karya Ilmiah (isikan di kolom yang sesuai)			Nilai Akhir Yang Diperoleh
		Seminar Internasional Terideks	Seminar Internasional Tidak Terideks	Seminar Nasional	
		30			
a.	Kelengkapan dan Kesesuaian unsur isi artikel (10%)	3			2,5
b.	Ruang lingkup dan kedalaman pembahasan (30%)	9			8,5
c.	Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9			8,0
d.	Kelengkapan unsur dan kualitas penerbit (30%)	9			8,5
Nilai Total = (100%)		**30**			**27,5**
Nilai pengusul =				**40%x 27,5**	**11,0**

KOMENTAR/ULASAN PEER REVIEW		
Kelengkapan dan Kesesuaian Unsur	:	Artikel memiliki kelengkapan yang sudah sesuai yaitu terdapat abstract, introduction, experimental methods, results and discussion, conclusions dan references. Tingkat plagiarisme artikel ini sebesar 11%.
Ruang Lingkup dan Kedalaman Pembahasan	:	Ruang lingkup karya ilmiah sesuai dengan bidang ilmu penulis. Tingkat kedalaman pembahasan cukup. Sekitar 19 referensi digunakan dalam pembahasan.
Kecukupan & Kemutakhiran Data & Metodologi	:	Metode penelitian yang disampaikan cukup lengkap. Referensi yang digunakan sebanyak 37 namun masih ada 1 referensi dengan tahun lebih dari 10 tahun terakhir.
Kelengkapan Unsur dan Kualitas Penerbit	:	Artikel ini diterbitkan dalam prosiding yang terindeks SCOPUS dengan nilai SJR 0,34. Terbitan dilengkapi dengan informasi volume, tahun dan halaman.

Semarang, 10 Okt 2022
Penilai 2

Prof. Dr. Ir. Hadiyanto, S.T., M.Sc., IPU
NIP 197510281999031004
Unit kerja : Fakultas Teknik
Bidang Ilmu : Ilmu Teknik Kimia
Jabatan/Pangkat : Guru Besar

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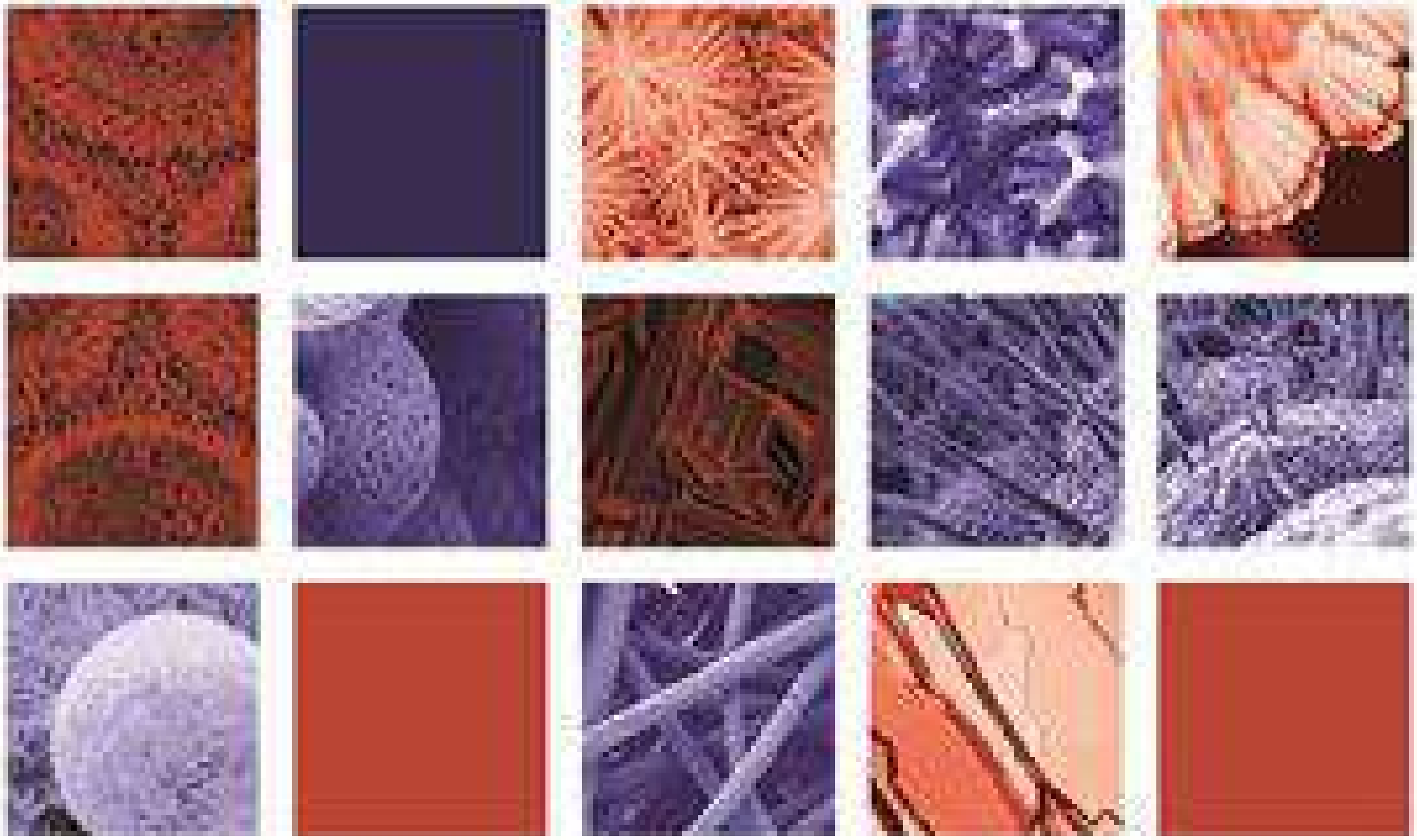

2nd International Conference on Chemical Engineering and Applied Sciences (Supplement)

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Volume 63, Supplement 1,
Pages S1-S532 (2022)

2nd International Conference on Chemical Engineering and Applied Sciences (Supplement)

Edited by Muhammad Aziz, Eng Vita Paramita, Anggun Puspitarini Siswanto, Sri Utami Handayani, Previari Umi Pramesti
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Sensitivity study of input parameters in the industrial low density polyethylene tubular reactor

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FEEDBACK

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TiO$_2$-M self-cleaning coating with antimicrobial and superhydrophilic properties

Rizgyandhaka Artha Prawira, Dessy Ariyanti
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FEEDBACK

Materials Today: Proceedings 63 (2022) S214–S221

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TiO_2-M self-cleaning coating with antimicrobial and superhydrophilic properties

Rizgyandhaka Artha Prawira, Dessy Ariyanti *

Department of Chemical Engineering, Faculty of Engineering, Universitas Diponegoro, Tembalang, Semarang 50275, Indonesia

A R T I C L E I N F O

Article history:
Available online 8 March 2022

Keywords:
Self-cleaning coating
Dip coating
Antibacterial
Degradation
Organic compounds

A B S T R A C T

Self-cleaning coating is an emerging coating technology that has prospect for further development and application. This research is an initial study that is expected to provide knowledge on the effectiveness of TiO_2 coating in addition of additives compounds such as graphene, Ag and Fe as self-cleaning coating. This research aimed to develop and characterize the TiO_2 based self-cleaning coating that is applied on the glass surface to determine their hydrophilicity, their ability to degrade organic compounds and their antibacterial properties on glass surfaces. The research was carried out by making a TiO_2-based coating combined with the addition of additives such as graphene, Ag and Fe at concentrations of 1, 5 and 10% using the simple dip coating method. The results show that the TiO_2 coating with 10% graphene gives the lowest water contact angle 13.67° (super hydrophilic wettability properties) with the optimum degradation ability of methylene blue with residual concentration of 0,5497 mg/L at 180 min contact time. Antibacterial properties were performed by TiO_2 coating with the addition of 10% Ag reflected in the clear radius of 5.333 mm, which reflected moderate inhibition (clear zone 5–10 mm) against *E. coli*.

1. Introduction

The development of materials science creates many new high-quality materials in various fields and currently are being developed with the concept of smart materials. Smart materials are defined as materials that have one or more properties that can be changed significantly in response to external stimuli. Physical properties that are generally changed are shape, stress, stiffness, humidity, electric or magnetic field, light, temperature, pH, chemical compounds, viscosity or attenuation. Smart materials can have self-cleaning, self-repairing, self-healing and self-sealing properties. Materials that have been developed as smart materials include Ni, Zn, Ti, Cu, graphene, TiO_2 and so on [1–4].

Titanium dioxide (TiO_2) is a transparent semiconductor material with high bandgap (3.23 eV), high refractive index and good mechanical performance. TiO_2 has photocatalytic properties that can generate electrons when exposed to UV light. One that can be applied from TiO_2 is as a self-cleaning coating [5]. Self-cleaning coating is a coating whose performance depends on solar energy to activate compounds that act as catalysts so that electrons from these compounds are released and used to degrade organic compounds. To obtain self-cleaning properties, the surface of an object must be coated with a material that has photocatalytic and super hydrophilic or superhydrophobic properties [6]. Hydrophobic properties are a combination of surface properties and roughness, the roughness surface morphology can cause an increase in the surface hydrophobicity of the material. A superhydrophobic surface is required to minimize the adhesion between the surface and the liquid [7]. In the research of Won, et al. [8], TiO_2 was applied on glass as a coating to see self-cleaning ability. TiO_2 with size of < 25 nm and TiO_2 type P25 respectively had a contact angle of 18.8° and 14.4° after UV irradiation. Glass coated with TiO_2 is more hydrophilic than glass without coating with contact angles of 32.7° and 32.4° after UV irradiation. The self-cleaning ability of TiO_2 can be increased by adding other materials, such as graphene, silver (Ag) and iron (Fe).

Graphene has a very regular arrangement of hexagonal carbon atoms forming sheets as thin as one atom. One of the TiO_2 /graphene composite materials was developed by Padmanabhan

* Corresponding author.
E-mail address: dessy.ariyanti@che.undip.ac.id (D. Ariyanti).

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Sensitivity study of input parameters in the industrial low density polyethylene tubular reactor

Ashraf Azmi [a,*], Fakhrony Sholahudin Rohman [b,c], Iylia Idris [a], Muzakkir Mohammad Zainol [a], Sudibyo [d]

[a] School of Chemical Engineering, College of Engineering, Universiti Teknologi MARA Shah Alam, 40450 Shah Alam, Selangor, Malaysia
[b] School of Chemical Engineering, Engineering Campus, Universiti Sains Malaysia, 14700 Nibong Tebal Penang, Malaysia 40450 Shah Alam, Selangor, Malaysia
[c] Department of Chemical Engineering, Universitas Brawijaya, Jalan Mayjen Haryono 167, Malang 65145, Indonesia
[d] Research Unit for Minerals Technology, Indonesian Institute of Sciences, Lampung, Indonesia

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Keywords:
LDPE
Tubular reactor
Sensitivity study
Polymerization
Free radical

ABSTRACT

Low-density polyethylene (LDPE) is one of the most widely used polymers in the world, and is produced in either tubular or autoclave reactors. As the LDPE industry turn into more competitive and its profit margins become tighter, manufacturers have to develop solutions to debottleneck the reactor output while abiding to the stringent product specification. As such, optimization offer the best option for reactor debottlenecking approach. However, since the LDPE polymerization in a tubular rector is an intrinsic nonlinear process, certain parameters need to be studied before it can be assigned as optimized variables in the optimization study. If these parameters are not properly identified, the optimization study might result in extra complicated sets of unresolvable solutions. Therefore, a model sensitivity study needs to be carried out to identify the most significant parameters that affect the performance of LDPE process in tubular reactor. An LDPE tubular reactor model was developed and validated with industrial data prior to the sensitivity study. Coefficient of determination (R^2) equivalent to 0.991 and 0.989 were obtained for the reactor temperature and the monomer conversion profiles, respectively. The comparison of the product properties at the reactor end also showed a satisfactory agreement where a low percentage of error in the range of 0 to 0.39% was obtained. Based on the sensitivity studies, monomer flow rate, initiator flow rate and solvent flow rate were identified to give significant effect to the performance of LDPE process in tubular reactor. Improvement in product quality measurement and kinetic rate constant parameters were highlighted as the novelty of the present study.

1. Introduction

LDPE is one of the most important commodity polymers with great industrial significance. The LDPE is known to be possessing extraordinary electrical and impact properties, and excellent resistance to chemical and moisture. Globally, LDPE is widely used for manufacturing of various plastic containers, plastic packaging for computer hardware, dispensing bottles, tubing, and various molded laboratory equipment. Nevertheless, its most common use is still in plastic bags. Global LDPE consumption reached almost 23 million tons in 2020 and the demand growth of 2.2% per year through 2025 is expected, with growth driven by the Asia Pacific Region [1].

The high-pressure polymerization of ethylene in tubular reactor is broadly employed to produce LDPE. The free radical polymerization in a tubular reactor is carried out under extreme conditions. The reactor is operated at very high pressure, typically between 150 and 250 MPa and temperatures of 325 – 625 K [2]. A typical high-pressure LDPE tubular reactor's length is ranging from 500 to 3000 m and characterized by very large ratios of length to diameter (L/D) from 1 to 6 $\times$ 10^4. The monomer conversion (X_M) in the tubular reactor is reported to be very low, which is in the range of 20 % to 30 % per pass [3].

Considering the requirement for high compression power and the expensive cost of raw materials, the operational cost of LDPE production in tubular reactor is undoubtedly high. The X_M, which

* Corresponding author.
E-mail address: ashraf.azmi@uitm.edu.my (A. Azmi).

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Response surface methodology for synthesis of bio-jet fuel from waste cooking oil using agitated ozone treatment

Anggun Puspitarini Siswanto [a,*], Mohamad Endy Yulianto [a], Dwi Handayani [a], Mirza Muhammad Faisal [a], Oktaviani Kusuma Wardani [a], Dmitriy Kuvshinov [b]

[a] Department of Industrial Chemical Engineering, Vocational School, Diponegoro University, Jalan. Prof. Sudharto, SH., Semarang 50275, Indonesia
[b] Department of Chemical Engineering, University of Hull, Cottingham Rd, Hull HU6 7RX, United Kingdom

ARTICLE INFO

Article history:
Available online 23 March 2022

Keywords:
Bio jet fuel
Cooking oil
Ozone treatment
RSM

ABSTRACT

Development of bio-jet fuel has gained much attention in the few years due to the carbon emission problem. Waste cooking oil (WCO) is an alternative raw material to produce medium chain of methyl ester which has similar properties with bio jet fuel. This research aims to investigate the Response Surface Methodology for synthesis of bio-jet fuel from waste cooking oil using agitated ozone treatment. In this study, bio jet fuel was produced using ozonolysis method with agitated ozone generator. The effect of reaction time, ozonolysis concentration and ozonolysis flow rate were optimized using response surface methodology (RSM) based on a central composite design (CCD). The optimum conditions obtained from RSM were 3% of ozonolysis concentration, 10 L/min of ozonolysis flow rate and 10 min of reaction time. Under this condition, the properties of bio-jet fuel met with the commercial standard of bio-jet fuel which are the density and %FFA conversation were 0.863 g/mL and 2.95%, respectively.

1. Introduction

The global aviation industry is facing significant problems related to carbon emissions. This has been under public spotlight because of their contribution to the climate change. Annually, it produces about 2–3% of all human-induced carbon dioxide (CO2) emissions which released to the atmosphere. Furthermore, the industry's reliance on the hydrocarbon fuels as a single product has also raised concerns over future feedstock, supply security and operational cost [1]. Therefore, development of bio jet fuel as the alternative fuel has gained much attention in the last few years.

Research on production of bio jet fuel from renewable resources has been conducted [2]. Several pathways during production of bio-jet fuel based on the raw material were studied. These pathways are lipids hydro-processing, alcohol-based biofuel, biomass pyrolysis to jet, gasification of biomass followed by Fischer-Tropsch process, and biomass upgrade utilizing the hydrothermal process. Moreover, the catalytic production of bio-jet fuels from biomass was also reviewed [3]. Main technologies were studied in converting biomass into liquid hydrocarbon fuels specifically used as aviation fuels. Particular emphasis focuses on those routes involving heterogeneous catalysts. The production of bio-jet fuel from renewable lignocellulosic biomass has also been investigated [4].

This study demonstrated a novel transformation of biomass into bio-jet and diesel fuels. The transformation included following three reaction steps: (i) the catalytic pyrolysis of sawdust into low-carbon aromatics, (ii) the production of C8-C15 aromatics by the aromatic alkylation and (iii) the production of C8-C15 cyclic alkanes by the hydrogenation of C8-C15 aromatics. Another study has been showed by investigation on synthesis of bio-jet fuel from crude palm oil (CPO) using hydro-processing of esters and fatty acids [5]. However, the high paraffin content in this fuel affects the cold flow properties such as cold filter plugging point and cloud point. These properties are depending on the type of feedstock used [6].

Recently, the new material using waste cooked oil (WCO) for production of bio-jet fuel with catalytic process was proposed [7]. WCO is also composed of triglycerides and long-chain carbon

* Corresponding author.
E-mail address: anggun.siswanto@live.undip.ac.id (A.P. Siswanto).

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