LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH: JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	UV Irradiation and Ozone Treatment of κ-Carrageenan: Kinetics and Products Characteristics		
Jumlah Penulis	:	5 orang		
Status Pengusul	:	**Penulis pertama**		
Identitas Jurnal Ilmiah	:	a. Nama Jurnal	:	Bulletin of Chemical Reaction Engineering and Catalysis (BCREC)
		b. Nomor ISSN	:	1978-2993, (Q3)
		c. Volume, Nomor, Bulan, Tahun	:	15/2/Agustus/2020
		d. Penerbit	:	Departemen Teknik Kimia Undip
		e. DOI artikel (jika ada)	:	https://doi.org/10.9767/bcrec.15.2.7047.319-330
		f. Alamat web Jurnal	:	https://ejournal2.undip.ac.id/index.php/bcrec/article/view/7047
		g. Terindeks di Scimagojr/Scopus/Web of Science/Asean Citation Index/DOAJ/CAS		
Kategori Publikasi Jurnal Ilmiah (beri ✓pada kategori yang tepat)	:	[√] Jurnal Ilmiah Internasional / Internasional bereputasi		
		[ ] Jurnal Ilmiah Nasional Terakreditasi		
		[ ] Jurnal Ilmiah Nasional terindeks di DOAJ, IPI, SINTA		

Hasil Penilaian Peer Review:

Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
	Reviewer I	Reviewer II	
i. Kelengkapan unsur isi jurnal (10%)	4,00	4,00	4,00
j. Ruang lingkup dan kedalaman pembahasan (30%)	10,50	11,00	10,75
k. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	10,50	10,50	10,50
l. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	11,00	11,00	11,00
Total = 100%	**36,00**	**36,50**	**36,25**
Nilai Pengusul (60% x nilai total)	**21,60**	**21,90**	**21,75**

Semarang,

Reviewer 2

Prof. Dr. Ir. Budiyono, M.Si
NIP. 196602201991021001
Unit kerja : Fakultas Teknik Universitas Diponegoro

Reviewer 1

Prof. Ir. Didi Dwi Anggoro, M.Eng., PhD
NIP. 196711141993031001
Unit kerja : Fakultas Teknik Universitas Diponegoro

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
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Kategori Publikasi Jurnal Ilmiah (beri ✓pada kategori yang tepat) :

- [√] Jurnal Ilmiah Internasional / Internasional bereputasi
- [ ] Jurnal Ilmiah Nasional Terakreditasi
- [ ] Jurnal Ilmiah Nasional terindeks di DOAJ, IPI, SINTA

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
	Internasional/ Internasional bereputasi** [√]	Nasional Terakreditasi [ ]	Nasional*** [ ]	
a. Kelengkapan unsur isi artikel (10%)	4,00			4,00
b. Ruang lingkup dan kedalaman pembahasan (30%)	12,00			10,50
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12,00			10,50
d. Kelengkapan unsur dan terbitan/jurnal (30%)	12,00			11,00
Total = (100%)	40,00			36,00
Nilai Pengusul	**= 36,00 x 0,60 = 21,60**			

Catatan Penilaian Artikel oleh Reviewer:

1. **Kesesuaian dan kelengkapan unsur isi jurnal:**
   Artikel ditulis lengkap sesuai dengan template jurnal BCREC, terdiri dari abstract, introduction, material and methods, results and discussions, conclusions, acknowledgments serta references. Kelengkapan unsur artikel tersaji dengan baik.
2. **Ruang lingkup dan kedalaman pembahasan:**
   Ruang lingkup sesuai bidang ilmu Teknik Kimia. Kebaruan artikel ini membahas tentang tinjauan model kinetika dan karakteristik produk pada kombinasi proses iradiasi sinar UV dan ozonasi kappa-karagenan. Pembahasan cukup baik yaitu dengan menjelaskan *reasoning* atau *scientific background* nya. Sitasi dalam pembahasan sebanyak 26 artikel atau 63,41%. Dilengkapi juga dengan 9 figure dan 3 table sehingga mempermudah memahami pembahasan.
3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**
   Artikel memiliki kemutakhiran data/informasi yang berasal dari referensi 10 tahun terakhir dari jurnal, sebanyak 26 dari 41 pustaka, atau 63,41 %. Metodologi disusun dengan lengkap dan terstruktur, instrumen-instrumen pengukur yang dipakai cukup memadai. Uji karakteristik produk cukup lengkap, yang meliputi uji viskositas, FTIR, SEM dan XRD.
4. **Kelengkapan unsur dan kualitas terbitan**
   Jurnal BCREC memiliki kategori Quartile (2019)=Q_3, SJR (2019) = 0,29; SNIP (2019)= 0,808; H index = 14; ISSN: 19782993; Publisher: *Department of Chemical Engineering, Diponegoro University*. Jurnal digolongkan jurnal internasional bereputasi. Editorial board dari berbagai negara, diantaranya Thailand, Finlandia, Indonesia, Malaysia, China, Italia, Saudi Arabia dll. diantaranya Nilai similaritas artikel berdasarkan Turnitin adalah 12%.

Semarang,
Reviewer 1

Prof. Ir. Didi Dwi Anggoro, M.Eng., PhD
NIP. 196711141993031001
Unit kerja : Fakultas Teknik Universitas Diponegoro

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Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
	Internasional/ Internasional bereputasi** [√]	Nasional Terakreditasi [ ]	Nasional*** [ ]	
a. Kelengkapan unsur isi artikel (10%)	4,00			4,00
b. Ruang lingkup dan kedalaman pembahasan (30%)	12,00			11,00
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12,00			10,50
d. Kelengkapan unsur dan terbitan/jurnal (30%)	12,00			11,00
Total = (100%)	40,00			**36,50**
Nilai Pengusul=	**(0,6x36,5)=21,90**			

Catatan Penilaian Artikel oleh Reviewer:

a. **Kesesuaian dan kelengkapan unsur isi jurnal:**
Kesesuaian dan kelengkapan unsur isi jurnal baik. Penyusunan artikel sesuai dengan template jurnal BCREC: abstract, introduction, material and methods, results and discussions, conclusions, acknowledgments serta references.

b. **Ruang lingkup dan kedalaman pembahasan:**
Artikel ini memiliki ruang lingkup dan kedalaman pembahasan yang baik. *Novelty* adalah mengkaji model kinetika reaksi proses dipolimerisasi karageenan dengan iradiasi UV dan ozonasi. Ruang lingkup sesuai dengan bidang ilmu teknik kimia. Pembahasan cukup komprehensif dengan jumlah sitasi dalam pembahasan sebanyak 26 artikel dari 41 pustaka yang diacu atau 63,41%.

c. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**
Data dan informasi serta metodologi disusun berdasarkan referensi terbaru 10 tahun terakhir sebanyak 26 buah dari 41 pustaka, atau 63,41 %. Namun belum dijelaskan data atau informasi tentang aplikasi produk sebagai senyawa bioaktif.

d. **Kelengkapan unsur dan kualitas terbitan**
Jurnal BCREC diterbitkan oleh Departemen Teknik Kimia Universitas Diponegoro. Jurnal digolongkan kategori Q_3 (2019), dengan nilai SJR (2019) = 0,29; SNIP (2019)= 0,808; H index = 14; ISSN: 19782993; Editorial board dari berbagai negara, format penulisan konsisten. Similaritas jurnal berdasarkan Turnitin adalah 12%.

Semarang,
Reviewer 2

Prof. Dr. Ir. Budiyono, M.Si
NIP. 19650220199102100 1
Unit kerja : Fakultas Teknik Universitas Diponegoro

e-ISSN: 1978-2993

Bulletin of Chemical Reaction Engineering & Catalysis

Volume 15, Issue 2, Year 2020 (Regular Issue: August 2020)

Available online since 30th July 2020 at: *https://bcrec.id*

Bull. Chem. React. Eng. Catal.	Vol. 15	No. 2	Pages: 290 - 603	Semarang, August 2020	e-ISSN: 1978-2993

Published by:

Department of Chemical Engineering, Diponegoro University

Masyarakat Katalis Indonesia – Indonesian Catalyst Society (MKICS)

Available online at BCREC website: https://bcrec.id

Bulletin of Chemical Reaction Engineering & Catalysis, 15 (2), 2020, i

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Bulletin of Chemical Reaction Engineering & Catalysis, 15 (2), 2020, iv

TABLE OF CONTENTS

Available online at BCREC website: https://bcrec.id

Bulletin of Chemical Reaction Engineering & Catalysis, 15 (2) 2020, 319-330

Research Article

UV Irradiation and Ozone Treatment of κ-Carrageenan: Kinetics and Products Characteristics

Aji Prasetyaningrum[1,*], W. Widayat[1], Bakti Jos[1], Yudhy Dharmawan[2], R. Ratnawati[1]

[1]Department of Chemical Engineering, Diponegoro University, Jl. Prof. Soedarto S.H., Tembalang, Semarang 50239, Indonesia.
[2]Faculty of Public Health, Diponegoro University, Jl. Prof. Soedarto S.H., Tembalang, Semarang 50269, Indonesia.

Received: 10th January 2020; Revised: 9th March 2020; Accepted: 13th March 2020; Available online: 30th July 2020; Published regularly: August 2020

Abstract

The low molecular weight (LMW) of sulfated polysaccharides including κ-carrageenan, is shows a wide spectrum of biological activities. This research investigates the influence of UV irradiation, ozone (O_3), and the combination of O_3/UV methods on the depolymerization of κ-carrageenan. The depolymerization kinetics of κ-carrageenan using the Advanced Oxidation Process (UV/O_3) was also studied. Furthermore, the intrinsic viscosity method was used to determine the average molecular weight of the research sample, and a mathematical model was developed to predict the kinetic rate constant, as a function of ozone dosage and UV irradiation intensity. Therefore, the physicochemical and morphological properties of the degraded κ-carrageenan were analyzed by FT-IR, SEM, and XRD. The intrinsic viscosity κ-carrageenan decreases with increasing UV light intensity and ozone concentration. The combination of UV/O_3 treatment appeared to be more effective than the individual approaches, as the highest kinetic rate constant for depolymerization was 1.924×10^{-4} min^{-1}, using 125 mg/L ozone concentration and 40 mW/cm^2 of UV lamp intensity. This research also evaluated the relationship between various experimental conditions, including UV lamp power dissipation and ozone concentration on the reaction kinetics model, and the results suggest that lower effect is contributed by UV irradiation intensity. In addition, FT-IR spectra showed the absence of any significant change in the functional properties of κ-carrageenan treated with UV and O_3 processes, although the morphological properties of the LMW κ-carrageenan were rougher and more porous than the native κ-carrageenan.

Keywords: κ-carrageenan; UV irradiation; ozone; depolymerization

How to Cite: Prasetyaningrum, A., Widayat, W., Jos, B., Dharmawan, Y., Ratnawati, R. (2020). UV Irradiation and Ozone Treatment of κ-Carrageenan: Kinetics and Products Characteristics. *Bulletin of Chemical Reaction Engineering & Catalysis*, 15(2), 319-330 (doi:10.9767/bcrec.15.2.7047.319-330)

Permalink/DOI: https://doi.org/10.9767/bcrec.15.2.7047.319-330

1. Introduction

Carrageenan is a high molecular weight sulfated polygalactose obtained from the marine macroalgae (Rhodophyceae). These are further classified according to the 3,6 anhydrogalactose present on the 4-linked residue, as well as the number and position of the sulfate group. Generally, three types have been identified, including the iota (ι-), lambda (λ-) and kappa (κ)-carrageenan, which is specifically the most widely cultivated in Indonesian waters. The κ-carrageenan consists of a common D-galactose backbone, characterized by alternating β(1,3)-D-

* Corresponding Author.
E-mail: aji.prasetyaningrum@che.undip.ac.id
Telp: +62-24-7460058, Fax: +62-24-76480675

Available online at BCREC website: https://bcrec.id

Bulletin of Chemical Reaction Engineering & Catalysis, 15 (2) 2020, 348-366

Research Article

One-Pot Access to Diverse Functionalized Pyran Annulated Heterocyclic Systems Using SCMNPs@BPy-SO_3H as a Novel Magnetic Nanocatalyst

Ke Chen[1,*], Guangzu He[1], Qiong Tang[1], Qahtan A. Yousif[2]

[1]*Hunan Polytechnic of Enviroment and Biology, Hunan, 421005, China.*
[2]*University of Al-Qadisiyah, College of Education, Department of Chemistry, Republic of Iraq.*

Received: 10th December 2019; Revised: 18th March 2020; Accepted: 24th March 2020; Available online: 30th July 2020; Published regularly: August 2020

Abstract

The SCMNPs@BPy-SO_3H catalyst was prepared and characterized using Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA), Vibrating Sample Magnetometry (VSM), Energy Dispersive X-ray Spectroscopy (EDX), X-ray Diffraction (XRD), and Scanning Electron Microscopy (SEM). Afterwards, its capability was efficiently used to promote the one-pot, three-component synthesis of pyrano[2,3-*c*]pyrazole and 2-amino-3-cyano-pyrano[3,2-*c*]chromen-5(4*H*)-one derivatives. The strategy resulted in the desired products with excellent yields and short reaction times. The SCMNPs@BPy-SO_3H catalyst was readily recovered using a permanent magnetic field and it was reused in six runs with a slight decrease in catalytic activity.

Keywords: Multicomponent reaction; Solvent-free conditions; Magnetic nanocatalyst; SCMNPs@BPy-SO_3H, pyrano[2,3-*c*]pyrazole; 2-amino-3-cyano-pyrano[3,2-*c*]chromen-5(4*H*)-one

How to Cite: Chen, K., He, G., Tang, Q., Yousif, Q.A. (2020). One-Pot Access to Diverse Functionalized Pyran Annulated Heterocyclic Systems Using SCMNPs@BPy-SO_3H as a Novel Magnetic Nanocatalyst. *Bulletin of Chemical Reaction Engineering & Catalysis*, 15(2), 348-366 (doi:10.9767/bcrec.15.2.6693.348-366)

Permalink/DOI: https://doi.org/10.9767/bcrec.15.2.6693.348-366

1. Introduction

In the last decade, considerable attention has been paid to the synthesis of Fe_3O_4 magnetic nanoparticles (MNPs) in various fields of applications due to their unique features, such as: high surface area, superparamagnetic behavior, low toxicity, biocompatibility, suitability for large-scale generation, simple recovery, and coupling with organic and inorganic molecules [1-9]. Coating an organic (biowastes) or inorganic (bentonite, alumina, silica, zeolite, and metal oxides) support surface on MNPs prevents these nanomaterials from agglomeration due to the strong dipole-dipole attraction; it also improves their efficiency in terms of catalytic activity and simplify separation [10-11]. Surface modifying of Fe_3O_4 magnetic nanoparticles with silica layer growth the available active sites and ameliorate the chemical stability [12]. Furthermore, because of the presence of active hydroxyl groups on the silica surfaces, a wide range of organic and inorganic linkers can be attached to them and promote their application in many chemical processes.

* Corresponding Author.
E-mail: chenkechina@126.com (K. Chen)

Available online at BCREC website: https://bcrec.id

Bulletin of Chemical Reaction Engineering & Catalysis, 15 (2) 2020, 390-404

Research Article

Totally-green Fuels *via* CO_2 Hydrogenation

Lorenzo Spadaro[1,2,*], Alessandra Palella[1,*], Francesco Arena[1,2]

[1]*Istituto CNR di Tecnologie Avanzate per l'Energia "Nicola Giordano", Via S. Lucia sopra Contesse n.5, 98126 Messina, Italy.*

[2]*Dipartimento di Ingegneria, Università degli Studi di Messina, Viale F. Stagno D'Alcontres 31, I-98166, Messina, Italy.*

Received: 1st February 2020; Revised: 21st April 2020; Accepted: 23rd April 2020; Available online: 30th July 2020; Published regularly: August 2020

Abstract

Hydrogen is the cleanest energy vector among any fuels, nevertheless, many aspects related to its distribution and storage still raise serious questions concerning costs, infrastructure and safety. On this account, the chemical storage of renewable-hydrogen by conversion into green-fuels, such as: methanol, *via* CO_2 hydrogenation assumes a role of primary importance, also in the light of a cost-to-benefit analysis. Therefore, this paper investigates the effects of chemical composition on the structural properties, surface reactivity and catalytic pathway of ternary CuO-ZnO-CeO_2 systems, shedding light on the structure-activity relationships. Thus, a series of $CuZnCeO_2$ catalysts, at different CuO/CeO_2 ratio (*i.e.* 0.2-1.2) were performed in the CO_2 hydrogenation reactions at 20 bar and 200-300 °C, (GHSV of 4800 STP $L \cdot kg \cdot cat^{-1} \cdot h^{-1}$). Catalysts were characterized by several techniques including X-ray Diffraction (XRD), N_2-physisorption, single-pulse N_2O titrations, X-ray Photoelectron Spectroscopy (XPS), and Temperature-programmed Reduction with H_2 (H_2-TPR). Depending on preparation method, the results clearly diagnostics the occurrence of synergistic structural-electronic effects of cerium oxide on copper activity, with an optimal 0.5 copper-to-cerium content. The rise of CuO loading up to 30% drives to a considerable increase of hydrogenation activity: C2Z1-C catalyst obtains the best catalytic performance, reaching methanol yield value of 12% at 300 °C. Catalyst activity proceeds according to volcano-shaped relationships, in agreement with a dual sites mechanism.

Keywords: Renewable energy; hydrogen-to-liquid-fuels (HTL); carbon dioxide recycling; methanol synthesis and synfuels

How to Cite: Spadaro, L., Palella, A., Arena, F. (2020). Totally-green Fuels *via* CO_2 Hydrogenation. *Bulletin of Chemical Reaction Engineering & Catalysis*, 15(2), 390-404 (doi:10.9767/bcrec.15.2.7168.390-404)

Permalink/DOI: https://doi.org/10.9767/bcrec.15.2.7168.390-404

1. Introduction

Although electric vehicles are the best environmental choice, the high costs and the limited availability of several materials do not allow the total replacement of thermal engines worldwide. Prompted by the need of meeting the rise in the energy demand and at the same time reducing polluting emissions, the industrialized countries are facing new model of development based on the renewable sources and zero emissions technologies adoption [1–3]. Regarding this, hydrogen is the most abundant element in the universe and it is considered a source of large-scale clean energy, which by 2050 could supply al-

* Corresponding Author.
Email: Lorenzo.spadaro@itae.cnr.it (L. Spadaro);
alessandra.palella@itae.cnr.it (A. Palella)