

The logo for Bulletin of Chemical Reaction Engineering & Catalysis (BCREC) features the acronym 'BCREC' in a stylized, bold, purple font with a white outline, set against a yellow background with horizontal black lines above and below.

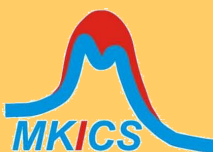
**e-ISSN: 1978-2993**

# Bulletin of Chemical Reaction Engineering & Catalysis

Volume 14, Issue 2, Year 2019 (Regular Issue: August 2019)

Available online since 30<sup>th</sup> April 2019 at: <https://bcrec.undip.ac.id/> or <https://bcrec.id>

Bull. Chem. React. Eng. Catal.	Vol. 14	No. 2	Pages: 238 - 477	Semarang, August 2019	e-ISSN: 1978-2993
-----------------------------------	---------	-------	---------------------	--------------------------	----------------------



Published by:

Department of Chemical Engineering, Diponegoro University

Masyarakat Katalis Indonesia – Indonesian Catalyst Society (MKICS)



## EDITORIAL TEAM

### EDITOR-IN-CHIEF

**Prof. Dr. I. Istadi**, Department of Chemical Engineering, Diponegoro University, Indonesia; E-mail: [istadi@che.undip.ac.id](mailto:istadi@che.undip.ac.id); (Scopus ID: 6506850769)

### REGIONAL/HANDLING EDITOR FOR ASIA-PACIFIC

**Prof. Dr. Hadi Nur**, Ibnu Sina Institute for Fundamental Science Studies, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor, Malaysia (Scopus ID: 6602169746)

**Prof. Dr. Y.H. Taufiq-Yap**, Centre of Excellence for Catalysis Science and Technology, Faculty of Science, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia (Scopus ID: 56272773200)

### REGIONAL/HANDLING EDITOR FOR EUROPE

**Prof. Dr. Dmitry Yu. Murzin**, Laboratory of Industrial Chemistry and Reaction Engineering, Abo Akademi University; Biskopsgatan 8 20500, Turku/Åbo, Finland (Scopus ID: 18037974700)

### ASSOCIATE (HANDLING) EDITORS

**Prof. Dr. Andri Cahyo Kumoro**, Department of Chemical Engineering, Diponegoro University, Indonesia (Scopus ID: 22980375000)

**Assoc. Prof. Dr. Luqman Buchori**, Department of Chemical Engineering, Diponegoro University, Indonesia (Scopus ID: 55559743300)

**Prof. Dr. Heru Susanto**, Department of Chemical Engineering, Diponegoro University, Indonesia (Scopus ID: 15835800800)

**Prof. Dr. Mohammad Djaeni**, Department of Chemical Engineering, Diponegoro University, Indonesia (Scopus ID: 16027817500)

### INTERNATIONAL ADVISORY EDITORIAL BOARDS

#### Prof. Dr. Bunjerd Jongsomjit

Department of Chemical Engineering, Chulalongkorn University, Bangkok, Thailand (Scopus ID: 6603065177)

#### Prof. Dr. Arief Widjaja

Dept. of Chemical Engineering, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia (Scopus ID: 13003143800)

**Prof. Dr. Toru Wakihara**, Yokohama National University, Graduate School of Environment and Information Sciences, Yokohama, Japan, (Scopus ID: 12789042600)

#### Prof. Dr. Valeria Di Sarli

Institute for Research on Combustion - National Research Council of Italy (CNR), Piazzale V. Tecchio 80, 80125, Napoli, Italy (Scopus ID: 16021366800)

**Prof. Dr. Jose E. Castanheiro**, Dept. of Chemistry, University of Evora, CQE, Evora, Portugal (Scopus ID: 6506163997)

**Prof. Dr. Rafael Molina**, Estado Sólido y Catálisis Ambiental, Departamento de Química, Facultad de Ciencias, Universidad Nacional de Colombia, Carrera 30 45-03, Bogotá, D.C., Colombia (Scopus ID: 7202381846)

**Prof. Dr. Kalama Jalama**, Dept. of Chemical Engineering, University of Johannesburg, P.O. Box 17011, Doornfontein 2028, Johannesburg, South Africa (Scopus ID: 15029880600)

**Prof. Dr. Ho-Shing Wu**, Dept. of Chemical Engineering & Material Science, Yuan-Ze University, 135 Yuan Tung Road, Chung Li, Taoyuan, 32003, Taiwan, Province of China, (Scopus ID: 7405581723)

**Dr. R. Rodiansono**, Department of Chemistry, Lambung Mangkurat University, Indonesia (Scopus ID: 55785853800)

#### Prof. Dr. Mostafa Barigou

School of Chemical Engineering, University of Birmingham, Edgbaston, Birmingham B15 2TT, United Kingdom, (Scopus ID: 7003356054)

#### Prof. Dr. Raghunath V. Chaudhari

Center for Environmental Beneficial Catalysis, Dept. of Chemical and Petroleum Engineering, The University of Kansas, 1501 Wakarusa Dr., Building B-Room 112B, Lawrence, KS 66047-1803, USA, (Scopus ID: 7101777898)

#### Prof. Dr. Sibudjing Kawi

Dept. of Chemical and Biochemical Engineering, National University of Singapore, Singapore, (Scopus ID: 7006257898)

#### Prof. Dr. Nor Aishah Saidina Amin

Faculty of Chemical and Natural Resources Engineering, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor, Malaysia, (Scopus ID: 35489910900)

#### Assoc. Prof. Dr. Oki Muraza

CENT & Dept. of Chemical Engineering, King Fahd University of Petroleum and Minerals, PO Box 5040 Dhahran 31261 KSA, Saudi Arabia, (Scopus ID: 22433275900)

#### Prof. Dr. K. Kusmiyati

Dept. of Industrial Engineering, Universitas Dian Nuswantoro, Semarang, Indonesia (Scopus ID: 7409816823)

#### Assoc. Prof. Dr. Rino R. Mukti

Division of Inorganic and Physical Chemistry, Faculty of Mathematics and Natural Sciences, Institut Teknologi Bandung, Jl. Ganesha no.10 Bandung 40132, Indonesia, (Scopus ID: 12244105600)

#### Prof. Dr. S. Subagjo

Dept. of Chemical Engineering, Institut Teknologi Bandung, Jl. Ganesha 10, Bandung, Indonesia (Scopus ID: 51462066900)



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



Bulletin of Chemical Reaction Engineering & Catalysis, 14 (2), 2019, ii

### AIMS AND SCOPE

**Bulletin of Chemical Reaction Engineering & Catalysis (e-ISSN: 1978-2993)**, an international journal, provides a forum for publishing the novel technologies related to catalyst, catalysis, chemical reactor, kinetics, and chemical reaction engineering. Scientific articles dealing with the following topics in chemical reaction engineering, catalysis science and engineering, catalyst preparation method and characterization, novel innovation of chemical reactor, etc., are particularly welcome.

This journal encompasses original research articles, review articles, and short communications, including: fundamental of catalyst and catalysis; fundamental of chemical reaction engineering; kinetics studies of chemical reaction engineering; materials and nano-materials for catalyst; kinetics studies of materials research; chemistry of catalyst and catalysis; applied chemical reaction engineering; applied catalysis; applied bio-catalysis; applied bio-reactor; membrane bio-reactor; chemical reactor design; catalyst regeneration; catalyst deactivation; surface chemistry of catalyst; bio-catalysis; enzymatic catalytic reaction; kinetic studies of enzymatic reaction; industrial practice of catalyst; industrial practice of chemical reactor engineering; application of plasma technology in catalysis and chemical reactor; and advanced technology for chemical reactors.

The manuscript articles should be submitted by online in MS Word / Open Office / PDF file format to Editorial Office through **Online Submission interface at: <https://ejournal2.undip.ac.id/index.php/bcrec>**. The Author must read the author guidelines of this journal first before submitting a manuscript.

### PUBLICATION INFORMATION

**Bulletin of Chemical Reaction Engineering & Catalysis (e-ISSN: 1978-2993)**

Short journal title: *Bull. Chem. React. Eng. Catal.*

For year 2019, 3 issues (Volume 14, Issue 1 (April), Issue 2 (August), and Issue 3 (December)) are scheduled for publication. Commencement of publication: January 2008.

Bulletin of Chemical Reaction Engineering & Catalysis, initialized as BCREC, is published freely open access of fulltext PDF articles via journal website (<https://bcrec.undip.ac.id> or <https://bcrec.id>). The BCREC journal is published by Department of Chemical Engineering, Diponegoro University jointly with *Masyarakat Katalis Indonesia* - Indonesian Catalyst Society (MKICS).

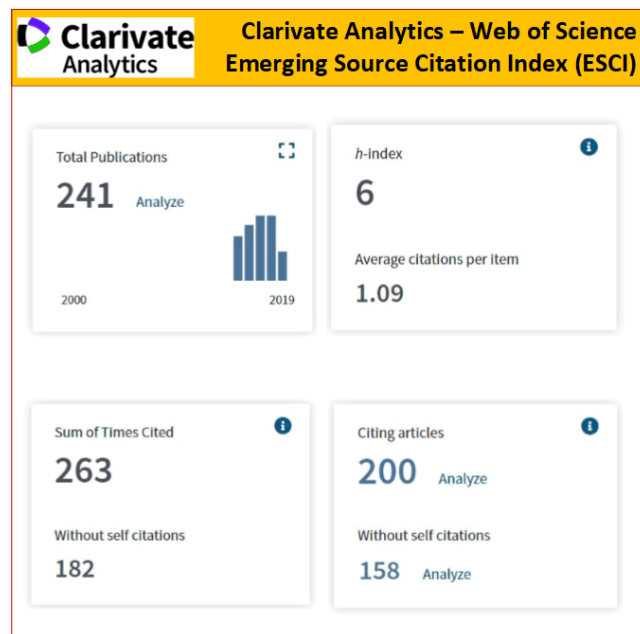
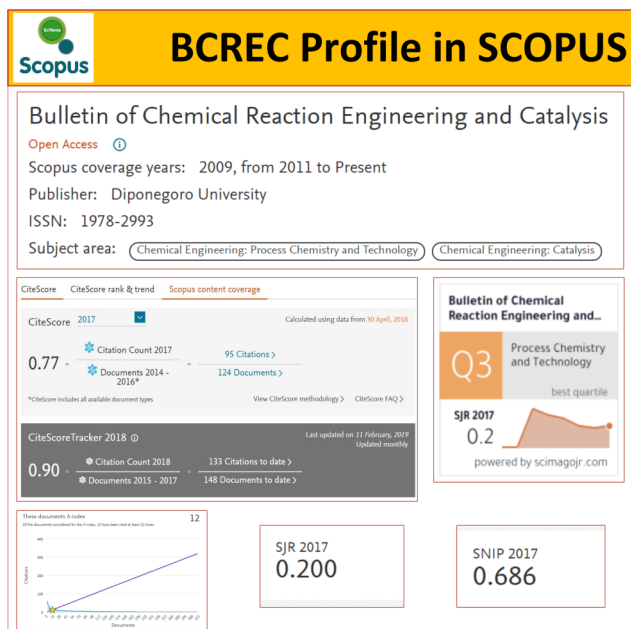
The BCREC journal has been indexed and abstracted by: Elsevier Products (Scopus, Compendex/Engineering Village), Web of Science (Emerging Source Citation Index) by Clarivate Analytics, Chemical Abstract Services, CABI, ASEAN Citation Index, DOAJ, Digital Dimensions, Microsoft Academics, and other reputable indexers.

Fulltext PDF of this journal has also been distributed around the world by EBSCO Publishing (Academic Search Complete, Academic Search Premiere, and Academic Search R&D packages) and ProQuest Databases started from Volume 4 Number 1 Year 2009 to present. The BCREC journal becomes CrossRef Member since 2012, so that all articles published by this journal have DOI unique numbers.



## JOURNAL CITATIONS AND IMPACT FACTOR ANALYSIS (2019)

- \* Journal Impact Factor in Scimago (2018) : SJR = 0.200; SNIP = 0.686
- \* H-index in Scimago (2018) : 10 (2018)
- \* Scopus ID : 19900191860
- \* CiteScore Scopus Tracker (per April 2019) : 0.88
- \* H-index in Web of Science (Clarivate Analytics) : 6 (2018)
- \* Averaged Citation per Item in WoS Clarivate Analytics: 1.09
- \* Google Scholar (h-index / h5-index / i10-index) : 17 / 15 / 40
- \* Google Scholar Citation (total) : 1611
- \* Google Scholar Citation (5 years) : 1384
- \* Dimensions - Average Field Citation Ratio (FCR) : 0.28





### INDEXING AND ABSTRACTING

Bulletin of Chemical Reaction Engineering & Catalysis (e-ISSN: 1978-2993) has been covered (indexed and abstracted) by following indexing services:

1. Scopus - Elsevier (2009-now) (<https://www.scopus.com/sourceid/19900191860>)
2. EI Compendex - Engineering Village (2011-now)
3. EnCompassLIT - Engineering Village (2011-now)
4. Scimago Journal Ranking (<https://scimagojr.com/journalsearch.php?q=+19782993&tip=iss>)
5. Web of Science Core Collection Database from Clarivate Analytics (<http://ip-science.thomsonreuters.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=1978-2993>)
6. Emerging Source Citation Index (from Clarivate Analytics, Web of Science) (<http://ip-science.thomsonreuters.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=1978-2993>)
7. Dimensions - Digital Science ([https://app.dimensions.ai/discover/publication?and\\_facet\\_journal=jour.1142571&order=times\\_cited](https://app.dimensions.ai/discover/publication?and_facet_journal=jour.1142571&order=times_cited))
8. ASEAN Citation Index (2015-now) (<http://www.asean-cites.org/index.php?r=contents%2Findex&id=9>)
9. Microsoft Academic (2015-now) (<https://academic.microsoft.com/#/detail/2738450280>)
10. ResearchGate ([https://www.researchgate.net/journal/1978-2993\\_Bulletin\\_of\\_Chemical\\_Reaction\\_Engineering\\_and\\_Catalysis](https://www.researchgate.net/journal/1978-2993_Bulletin_of_Chemical_Reaction_Engineering_and_Catalysis))
11. Ingenta Connect (<http://www.ingentaconnect.com/content/doi/19782993>)
12. ProQuest Databases (since 2017) (<http://www.proquest.com/products-services/databases/>)
13. EBSCOhost - TOC Premier; Energy & Power Source; Academic Search Premier; Academic Search Alumni Edition; Academic Search R&D; Academic Search Complete (2009-.)
14. ROAD ISSN (<http://road.issn.org/issn/1978-2993-bulletin-of-chemical-reaction-engineering-amp-catalysis#.V9qpxTsSAyE>)
15. WorldCat OCLC - (<https://www.worldcat.org/profiles/bcrec/lists/3665652>)
16. CiteULike - (2012-now) (<http://www.citeulike.org/group/20135>)
17. Mendeley - (2012-now) (<http://www.mendeley.com/groups/3847801/bulletin-of-chemical-reaction-engineering-catalysis/>)
18. SHERPA/RoMEO - (<http://www.sherpa.ac.uk/romeo/search.php?source=journal&sourceid=29003&la=en&fIDnum=|&mode=simple>)
19. CrossRef Member- (2012-now) (<http://www.crossref.org>)
20. Index Copernicus - (<http://journals.indexcopernicus.com/masterlist.php?name=Master&litera=B&start=150&skok=30>)
21. CABI Direct (2011-now) - (<http://www.cabdirect.org/>)
22. SCIRUS - for scientific information (2010-now) (<http://www.scirus.com/>)
23. Chemical Abstract Service (2010-now) (CAS Source Index (CASSI) ; <http://www.cas.org>), a division of American Chemical Society (ACS).
24. Academic Journal Database (<http://journaldatabase.org/journal/issn1978-2993>)
25. ULRICHSWEB Global Serial Directory (<http://ulrichsweb.serialssolutions.com>)
26. Google Scholar ([https://scholar.google.com/citations?hl=en&user=PadKS\\_wAAAAJ](https://scholar.google.com/citations?hl=en&user=PadKS_wAAAAJ))
27. EPRINTS Undip (<http://eprints.undip.ac.id>)
28. Directory of Open Access Journal (DOAJ) (<http://www.doaj.org>)

For detail please visit here: <https://ejournal2.undip.ac.id/index.php/bcrec/pages/view/indexing>.



## TABLE OF CONTENTS

1. Valorization of the Phosphate Fertilizers Catalytic Activity in 1-(Benzothiazolylamino) Methyl-2-Naphthol Derivatives Synthesis (Zimou, O., Malek, B., Elhallaoui, A., Ghailane, T., Ghailane, R., Boukhris, S., Habbadi, N., Hassikou, A., Souzi, A.) .....	(238 - 246)
2. In-situ Nitrous Acid Generation over Silica Imidazole Catalyst for Dyes Production (Hello, K.M., Fahad, N.G.) .....	(247 - 259)
3. Removal of Iron(II) Using Intercalated Ca/Al Layered Double Hydroxides with $[\alpha\text{-SiW}_{12}\text{O}_{40}]^{4-}$ (Taher, T., Christina, M.M., Said, M., Hidayati, N., Ferlinahayati, F., Lesbani, A.) .....	(260 - 267)
4. Ethanol Dehydrogenation to Acetaldehyde over Activated Carbons-Derived from Coffee Residue (Ob-eye, J., Praserthdam, P., Jongsomjit, B.) .....	(268 - 282)
5. Preparation, Characterization, and Catalytic Activity of Tin (Antimony) Substituted and Lacunar Dawson Phosphotungstomolybdates for Synthesis of Adipic Acid (Guerroudj, M.R., Dermeche, L., Mouheb, L., Mazari, T., Benadji, S., Rabia, C.) .....	(283 - 293)
6. Synthesis of Polytetrahydrofuran Using Protonated Kaolin as A Solid Acid Catalyst (Moumen, A., Hattab, Z., Belhocine, Y., Guerfi, K., Rebbani, N.) .....	(294 - 300)
7. Catalytic Dehydrogenation of para-Diethyl Benzene to para-Divinyl Benzene over Iron Oxide Supported Catalyst (Srivastava, V.K., Sharma, N., Jasra, R.V.) .....	(301 - 308)
8. Bio-kerosene and Bio-gasoil from Coconut Oils via Hydrocracking Process over Ni-Fe/HZSM-5 Catalyst (Al-Muttaqii, M., Kurniawansyah, F., Prajitno, D.H., Roesyadi, A.) .....	(309 - 319)
9. Kinetic of Anthocyanin Degradation in Roselle Extract Dried with Foaming Agent at Different Temperatures (Sasongko, S.B., Djaeni, M., Utari, F.D.) .....	(320 - 325)
10. Kinetic Study of Anaerobic Digestion of Ketchup Industry Wastewater in a Three-stages Anaerobic Baffled Reactor (ABR) (Sumantri, I., Budiyo, B., Purwanto, P.) .....	(326 - 335)
11. Solid-phase Synthesis of Visible-light-driven BiVO <sub>4</sub> Photocatalyst and Photocatalytic Reduction of Aqueous Cr(VI) (Li, J., Chen, Y., Chen, C., Wang, S.) .....	(336 - 344)
12. Green Synthesis of [EMIm]Ac Ionic Liquid for Plasticizing MC-based Biopolymer Electrolyte Membranes (Ndruru, S.T.C.L., Wahyuningrum, D., Bundjali, B., Arcana, I.M.) .....	(345 - 357)
13. Comparison of Lewis Acidity between Al-MCM-41 Pure Chemicals and Al-MCM-41 Synthesized from Bentonite (Ali-Dahmane, T., Brahmi, L., Hamacha, R., Hacini, S., Bengueddach, A.) .....	(358 - 368)
14. Preparation and Candida rugosa Lipase Immobilization on Nylon-6 Grafted and Aminated (Polyvinyl Benzyl Chloride) Microfibers (Halin, N.I.A., Al-Khatib, M.F.R., Salleh, H.M., Nasef, M.M.) .....	(369 - 379)
15. The Optimised Statistical Model for Enzymatic Hydrolysis of Tapioca by Glucoamylase Immobilised on Mesostructured Cellular Foam Silica (Agustian, J., Hermida, L.) .....	(380 - 390)
16. A Performance Study of Home-Made Co-Immobilized Lipase from Mucor miehei in Polyurethane Foam on The Hydrolysis of Coconut Oil to Fatty Acid (Moentamaria, D., Muharja, M., Widjaja, T., Widjaja, A.) .....	(391 - 403)
17. Facile Template In-Situ Fabrication of ZnCo <sub>2</sub> O <sub>4</sub> Nanoparticles with Highly Photocatalytic Activities under Visible-Light Irradiation (Tan, V.T., Vinh, L.T., Khiem, T.N., Chinh, H.D.) .....	(404 - 412)
18. Highly Conductive and Soluble Polymer Synthesized by Copolymerization of Thiophene with Para-Methoxybenzaldehyde Using Clay Catalyst (Kherroub, D.E., Bouhadjar, L., Bouhadjar, B., Rahmouni, A., Dahmani, K., Belbachir, M.) .....	(413 - 420)
19. A System of Photocatalysis for NAD <sup>+</sup> Regeneration of Product of (S)-1-Phenylethanol by Enzymic Catalysis (Pu, S., Zhang, X., Huang, H., Yang, C., Li, D., Yang, J., Ouyang, J., Chen, X., Naseer, S., Shi, R.) .....	(421 - 426)
20. Cyclohexanone Oxidation over H <sub>3</sub> PMo <sub>12</sub> O <sub>40</sub> Heteropolyacid via Two Activation Modes Microwave Irradiation and Conventional Method (Idrissou, Y., Mouanni, S., Amitouche, D., Mazari, T., Marchal-Roch, C., Rabia, C.) .....	(427 - 435)
21. Evaluation of Enzyme Kinetic Parameters to Produce Methanol Using Michaelis-Menten Equation (Zainol, N., Ismail, S.N.) .....	(436 - 442)
22. Evaluation of Low Cost-Activated Carbon Produced from Waste Tyres Pyrolysis for Removal of 2-Chlorophenol (Manirajah, K., Sukumaran, S.V., Abdullah, N., Razak, H.A., Ainirazali, N.) .....	(443 - 449)
23. Synthesis of Chitosan/Zinc Oxide Nanoparticles Stabilized by Chitosan via Microwave Heating (Yusof, N.A.A., Zain, N.M., Pauzi, N.) .....	(450 - 458)
24. Effects of Ion Exchange Process on Catalyst Activity and Plasma-Assisted Reactor Toward Cracking of Palm Oil into Biofuels (Istadi, I., Buchori, L., Anggoro, D.D., Riyanto, T., Indriana, A., Khotimah, C., Setiawan, F.A.P.) .....	(459 - 467)
25. Kinetic Study of Saponin Extraction from Sapindus rarak DC by Ultrasound-Assisted Extraction Methods (Nafiunisa, A., Aryanti, N., Wardhani, D.H.) .....	(468 - 477)