

CURRICULUM VITAE



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Research Interest: Advanced Materials, Photocatalyst, Catalyst for Energy and

PERSONAL DETAILS

Nationality : Indonesia
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Link Google Scholar : <https://scholar.google.co.id/citations?user=R41IZfgAAAAJ&hl=id>
Link Scopus ID : <https://www.scopus.com/authid/detail.uri?authorId=57056429900>
Occupations : Head of Chemical Engineering Department, ITK (2023 to 2027)

FORMAL EDUCATION

University/ School	Courses	Supervisor	Year	GPA
Hiroshima University Hiroshima, Japan	Doctor of Engineering (Dr.Eng) Department of Chemical Engineering and Applied Chemistry	Prof. Takashi Ogi Prof. Kikuo Okuyama	2014 to 2017	4.00/4.00
National Cheng Kung University (NCKU), Taiwan	Master of Science (M.Sc) at Department of Chemical Engineering and Material Science	Prof. Jui-Hsiang Liu	2010 to 2012	3.72/4.00
Institut Teknologi Sepuluh Nopember (ITS), Surabaya- Indonesia	Bachelor of Chemical Engineering (B. Eng) at Faculty of Industrial Technology	Prof. Sugeng Winardi Dr. Widyastuti	2006 to 2010	3.54/4.00

PROFESSIONAL EXPERIENCES

1. Keynote Speaker 1st BICAME (Borneo International Conference on Applied Mathematics and Engineering), Institut Teknologi Kalimantan (ITK), **2017**.
2. Invited Speaker: Seminar Nasional Kimia dan Terapan, Universitas Mulawarman (UNMUL), **2021**.
3. Invited Speaker: Waste to Energy and Collaborative Research, Universitas Lambung Mangkurat (ULM), **2020**.
4. Guest Lecturer: Pengembangan Nanopartikel Sebagai Bahan Baku Sel Surya dan Remediasi Pengolahan Air Universitas Palangkaraya (UPR), **2020**.
5. Invited Speaker: Potential and Material Innovation of Photovoltaics (PV) Rooftop in Indonesia. Universitas Internasional Semen Indonesia (UISI), **2020**.
6. Invited Speaker: Digital Spring School in Bio-resources and Environmental Engineering (DSSBEE), University of Tsukuba, **2022**.
7. Invited Speaker: International Conference on Research Collaboration of Environmental Science, organized by cooperation and collaboration between The University of Kitakyushu and universities in Indonesia and Malaysia, **2023**.
8. Reviewer Jurnal Teknik Kimia. Universitas Pembangunan Nasional (UPN), JATIM, **2019 to present**.
9. Reviewer Jurnal IPTEKS ITS. Institut Teknologi Sepuluh Nopember (ITS), JATIM, **2021 to present**.
10. Reviewer Journal of Emerging Supply Chain, Clean Energy and Process Engineering (JESCEE), Universitas Pertamina, Jakarta, **2021 to present**.

HONORS, AWARDS, AND ACHIEVEMENTS

1. **Recipient of World Class Professor (WCP) program 2021 as Principal Investigator** with title: Akselerasi Pencapaian Indikator Kinerja Utama Serta Peningkatan Reputasi Kampus Institut Teknologi Kalimantan Melalui Kolaborasi Riset Internasional Bidang Energi dan Renewable Materials, funded by Indonesia Endowment Funds for Education (LPDP).
2. **Recipient of World Class Professor (WCP) program 2022 as Principal Investigator** with title: Desain Kolaborasi dan Implementasi Kerja Sama Pusat Studi Riset Bidang Energi dan Teknologi Rekayasa Material Terbarukan Melalui Visiting Research dan Joint International Publication, funded by The Indonesia Endowment Funds for Education (LPDP).
3. **Recipient of World Class Professor (WCP) program 2023 as Principal Investigator** with title: Accelerating the Achievement of Higher Education Key Performance Indicators by Strengthening Research Collaboration and Collaboration Networks between the Kalimantan Institute of Technology and World Class University Partners (QS-100 WUR), funded by The Indonesia Endowment Funds for

Education (LPDP).

4. **Best 1st Awardee in the Competition for Innovation, Creativity, Technology, Entrepreneurship and Society** entitled: Down Hanging Sponge Reactor (DHS) Cultivation System: Efficient and Eco-Friendly Technology for Marine Algae Farming and Wastewater Treatment. **The International Higher Education Institute (PECIPTA) Creation Conference and Expo Organized by Universiti Malaysia Kelantan, 2022.**
5. **Awardee as Young Lecturer** with Best Article Publication in Anniversary Celebration (1st LUSTRUM) of Institut Teknologi Kalimantan (ITK), **2019.**
6. **Awardee as Young Lecturer** with Productive Journal Writer in Anniversary Celebration (3rd LUSTRUM) of Institut Teknologi Kalimantan (ITK), **2021.**
7. **Awardee as Young Lecturer** with Productive Journal Writer in Anniversary Celebration (4th LUSTRUM) of Institut Teknologi Kalimantan (ITK), **2022.**
8. **Awardee Indonesia Toray Science and Foundation (ITSF).** Science and Technology Research Grant (STRG) with entitled Simultaneously Stability and Efficiency Improvement of Calcium Titanate (CaTiO_3)-based Perovskite Solar Cell (PSCs) using Hydrophobic Polystyrene Particle. 25th ceremony, **2018.**
9. **Awardee Kurita Water and Environmental Foundation (KWEF)** Overseas Research Grant with entitled Development of Biocomposite-Gel Adsorbent from Silk Fibroin and Fruit-Seed Waste for Water Treatment Application, **2019.**
10. **Grantee Southeast Asian Regional Centre for Tropical Biology (SEAMEO BIOTROP)** with project entitled: Biotransformation of Palm Oil Mill Effluent to Biofuel by Immobilized Microalgae in a Down Flow Hanging Sponge Reactor (DHS), **2021.**
11. **Recipient of Competitive National Research Grant** funding program, from the Ministry of Education and Culture Republic of Indonesia (DIKTI) as **Principal Investigator** with title: Pengembangan Material Katalis Heterogen Nanokomposit ZnO/SiO_2 Dari Limbah Baterai dan Abu Sekam Padi Untuk Reaksi Transesterifikasi Pada Pembuatan Biodiesel Berbasis Minyak Non-Edible. **Research Grant Program 2021 to 2023.**
12. **Recipient of Competitive National Research Grant** funding from the Ministry of Education and Culture Republic of Indonesia (DIKTI) as **Co-Principal Investigator** with title: Pemanfaatan Makroalga Khas Indonesia dengan Penambahan Amberlyst-15 Catalyst untuk Bahan Bakar Cair Ramah Lingkungan serta Aplikasi Bio-char sebagai Adsorben Logam Berat. **Research Grant Program 2022.**
13. **Recipient of Competitive National Research Grant** funding from the Ministry of Education and Culture Republic of Indonesia (DIKTI) as **Co-Principal Investigator** with title: A novel mesoporous catalyst derived from algae for biodiesel production using conventional, microwave, and subcritical methanol. **Research Grant Program 2023 to 2024.**
14. **Recipient of Japan Visiting Research the Strategic Base in Asia Creating and Developing of Global Minded Imaging Science (BAGIS),** funded by Japan Society for the Promotion of Science fellowship Core-to-Core program **2022.**
15. **Recipient of Collaboration Research ITK-ITS** funding Program, as **Co-Principal Investigator** with title: Structures and Properties Optimization heterojunction photocatalyst of TiO_2/WS_2 and $\text{TiO}_2/\text{Ni(OH)}_2$ on the Hydrogen Production Efficiency, **2022.**
16. **Recipient of Japan-ASEAN Science Technology and Innovation Platform (JASTIP-2023)** research grant funding Program, as **Co-Principal Investigator** with title: Nano-catalyst Zeolit HZSM-5 Supported Metal Transition for the Catalytic Conversion of Non-Edible Oils from Indonesia as an Alternative Source of Biofuel, **2023.**
17. **Recipient of Collaboration Research ITK-ITS** funding Program, as **Co-Principal Investigator** with title: Intensified biodiesel production from Palm Fatty Acid Distillate (PFAD) by Using Esterification-Assisted Ultrasonic Process, **2023.**
18. **Recipient of Collaboration Research ITK-ITS** funding Program, as **Co-Principal Investigator** with title: Simultaneously Hydrogen Production and Organic Pollutant Degradation using Heterojunction Photocatalyst of ZnO/NiO -doped CNT, **2023.**
19. **Best 3rd Poster Paper Competition Awardee** with entitled: Synthesis and Characterization of Liquid Crystalline Esters Containing ODOPB Group and its Inclusion Complexes. International conference of Symposium Polymer Synthetic and Application, received from Chung Yuan Christian University (CYCU), Zhongli District, Taoyuan City, Taiwan, **2012.**
20. **Awardee as Conference Chair on 1st International Conference on Industrial and Technology (ICONIT),** Organized by Institut Teknologi Kalimantan (ITK) and Supported by Research Synergy Foundation (RSF), **2019.**
21. **Best Paper Award BICAME (3rd Borneo International Conference on Applied Mathematics and Engineering), Institut Teknologi Kalimantan (ITK),** with entitled: Kinetic Studies of Methylene Blue Degradation using CaTiO_3 Photocatalyst from Chicken Eggshells, **2020.**

22. **Finalist of DAAD Falling Walls Lab Jakarta** for creators, innovators, trailblazers, and visionaries, with entitled Breaking the Wall of Affordable Solar Cell, organized by German Academic Exchange Service (DAAD), 2018.
23. **Grantee MEXT-JAPAN** (Ministry of Education, Culture, Sports, Science, and Technology) for Doctoral Course Full Scholarship Program, Hiroshima University, Japan, (2014-2017).
24. **Grantee National Cheng Kung University (NCKU)-Taiwan** for Master degree Full Scholarship Program, (2010-2012).

RESEARCH PUBLICATIONS AND BOOKS

1. **L. Ernawati**, T. Ogi, R. Balgis, K. Okuyama, M. Stucki, S. C. Hess, W. J. Stark. Hollow Silica as an Optically Transparent and Thermally Insulating Polymer Additive., **ACS. Langmuir**, 32(1), 338-345, **2016**.
2. **L. Ernawati**, R. Balgis, T. Ogi, K. Okuyama. Tunable Synthesis of Mesoporous Silica Particles with Unique Radially Oriented Pore Structures from Tetramethyl Orthosilicate via Oil-Water Emulsion Process. **ACS. Langmuir**, 33(3), 783-790, **2017**.
3. R. Balgis, **L. Ernawati**, T. Ogi, K. Okuyama, L. Gradon., Controlled Surface Topography of Nanostructured Particles Prepared by Spray-Drying Process., **American Institute of Chemical Engineers AIChE. J.**, 63(5), 1503-1511, **2017**.
4. **L. Ernawati**, R. Balgis, T. Ogi, K. Okuyama, T. Takada., Role of Acetone in the Formation of Highly Dispersed Cationic Polystyrene Nanoparticles. **Chem. Process Eng.**, De Guyter 38(1), **2017**.
5. S. Gunawan, T. Widjaja, S. Zullaikah, **L. Ernawati**, N. Istianah, H. W. Aparamarta, D. Prasetyoko. Effect of Fermenting Cassava with Lactobacillus Plantarum, Saccharomyces Cereviseae, and Rhizopus Oryzae on the Chemical Composition of Their Flour. **Int. Food Res. J.**, 22(3), 1280-1287, **2015**.
6. N. Istianah, S. Gunawan, **L. Ernawati**, A. K. Anal. Application of modified sorghum flour for improving bread properties and nutritional values. **Int. Food Res. J.**, 25(1), 166-173, **2018**.
7. **L. Ernawati**, R. A. Wahyuono, A. Azhary, A. R. N. Sutanto, I. K. Maharsih, N. Widiastuti, H. Widiyandari. Mesoporous WO₃/TiO₂ Nanocomposites Photocatalyst for Rapid Degradation of Methylene Blue in Aqueous Medium. **International J. Engineering TRANSACTIONS A: Basics**. 32 (10), 1345-1352, **2019**.
8. **L. Ernawati**, R. A. Wahyuono, I. K. Maharsih, A. W. Yusariarta, A. D. Laksono, C. W. Kartikowati, A.B.D Nandiyanto. Fotodegradasi Zat Pewarna Tekstil (Rhodamine B) Menggunakan Adsorben Berbasis Material Komposit Kalsium Titanate (CaTiO₃). **Jurnal Teknik Kimia**, 14(2), 32-39. **2020**.
9. **L. Ernawati**, R. A. Wahyuono, H. Widiyandari, D.D. Risanti, A.W. Yusariarta, Rebeka Rebeka, V. Sitompul. Experimental Data of CaTiO₃ Photocatalyst for Degradation of organic pollutants (Brilliant Green Dye)-Green Synthesis, Characterization and Kinetic Study. **Data in Brief**, 32, 106099, **2020**.
10. **Ernawati L**, Wahyuono RA, Halim A, Noorain R, Widiyastuti W, Dewi RT, Enomae T. Hierarchically 3-D Porous Structure of Silk Fibroin-Based Biocomposite Adsorbent for Water Pollutant Removal. **Environments.**, 8(11):127. **2021**.
11. H. Widiyandari, P. Pardoyo, J. Sartika, O. A. Putra, A. Purwanto, **L. Ernawati**. Synthesis of Mesoporous Silica Xerogel from Geothermal Sludge using Sulfuric Acid as Gelation Agent. **International Journal of Engineering, Transactions A: Basics**, 34(7), 1569-1575, **2021**.
12. Rozyanti Binti Mohamad Mohd Edyazuan Azni, Atiqah Zainal Abidin, Roslan Noorain, Sharifah Mariam Syed Hitam, **Lusi Ernawati**, Rosnah Abdullah, Ahmad Shoiful. Performance of Chlorella sp. and Multicultural Bacteria in Removing Pollutants from Nutrient-Rich Wastewater. **ASEAN Journal of Chemical Engineering**, 22(1), 42 – 57, **2022**.
13. Halim, A., **Ernawati, L.**, Ismayati, Martak, F., Enomae, T. Bioinspired cellulose-based membranes in oily wastewater treatment. **Front. Environ. Sci. Eng.** 16(94), **2022**.
14. A. D. Laksono, **L. Ernawati**, R. Abdullah, S. Hardianti, T. Agustina, M. P. D. Lubis, I. Y. Wardhani, N.H. Hassan. Physical and mechanical characteristics of composite woods fiber-based polyester binders, **Journal of Wood Chemistry and Technology**, 42:5, 371-380, **2022**.
15. **Ernawati, L.**, Wahyuono, R.A., Halim, A., Widiastuti, N., Sabrina, A., Handayani, K., Silk Fibroin/Soursop Seed Bio-Adsorbent for Crystal Violet and Copper Metal Ion Removal. **J. Eng. Technol. Sci.** 54, 220514. **2022**.
16. Inggit Kresna Maharsih, Memik Dian Pusfitasari, **Lusi Ernawati**, Citra Ayu Saraswati Putri, Muhammad Taufiq Hidayat. The Formulation of Agrowaste-based Edible Coating Composition to Preserve Quality of Pineapple. **Jurnal Keteknik Pertanian**. 10(2),145-161, **2022**.

17. Andromeda Dwi Laksono, Retno Damastuti, Nur Layli Amanah, Muhammad Hawary Assa, Yichia Cheng, **Lusi Ernawati**, Agung Nugroho, Hairus Abdullah. Photocatalytic and Adsorptive Removal of Liquid Textile Industrial Waste with Carbon-Based Nanomaterials. *Green Energy and Technology*. Springer, Singapore. <https://doi.org/10.1007/978-981-19-6748-1>.
18. **Lusi Ernawati**, Mutia Reza, Adela Clara Synthia, Dwi Aprilia Kartikasari, Inggit Kresna Maharsih, Abdul Halim, Role of Chemical Activating Agent on the Characteristics of Activated Carbon Derived from Fruit-Peel Waste for Aqueous Dye Removal. **Key Engineering Materials**, Trans Tech Publications Ltd, 937, 165-180, **2022**. <https://doi.org/10.4028/p-btb390>.
19. Hou, W., Xing, Y., Li, C., Li, T., Liu, D., **Ernawati, L.**, Sunarso, J., Meng, X., 2023. Achieving high-efficiency and broad bandwidth with low filler loading for hierarchical Fe₃O₄/Co-MOF absorbers. **Mater. Res. Bull.** 161, 112171. <https://doi.org/10.1016/j.materresbull.2023.112171>
20. Yang, A., **Ernawati, L.**, Wang, M., Kong, Z.Y., Sunarso, J., Sun, S., Shen, W., 2023. Multi-objective optimization of the intensified extractive distillation with side-reboiler for the recovery of ethyl acetate and methanol from wastewater. **Sep. Purif. Technol.** 310, 123131.
21. Zuming He, Hanpei Yang, Ngie Hing Wong, **Lusi Ernawati**, Jaka Sunarso, Zhengyi Huang, Yongmei Xia, Yong Wang, Jiangbin Su, Xiaofei Fu, Mi Wu. Construction of Cu₇S₄@CuCo₂O₄ Yolk-Shell Microspheres Composite and Elucidation of Its Enhanced Photocatalytic Activity, Mechanism, and Pathway for Carbamazepine Degradation. **Small-Wiley Online Library**, <https://doi.org/10.1002/smll.202207370>.
22. Zhengxin Yao, Roufei Chen, Ning Han, Hongqi Sun, Ngie Hing Wong, **Lusi Ernawati**, Shaobin Wang, Jaka Sunarso, Shaomin Liu, Natural manganese ores for efficient removal of organic pollutants via catalytic peroxy monosulfate-based advanced oxidation processes. **Asia Pacific Journal of Chemical Engineering**, <https://doi.org/10.1002/apj.2907>.
23. Xianqiang Xiong, Ngie Hing Wong, **Lusi Ernawati**, Jaka Sunarso, Xiao Zhang, Yanxian Jin, Deman Han, Chenglin Wu, Binbin Yu, Xiaogang Yang, Yong Wang, Guihua Chen, Jun Yao. Revealing the enhanced photoelectrochemical water oxidation activity of Fe-based metal-organic polymer-modified BiVO₄ photoanode. **Journal of Colloid and Interface Science**, <https://doi.org/10.1016/j.jcis.2023.03.180>.
24. **Lusi Ernawati**, Ngie Hing Wong, Apip Amrullah, Ruri Agung Wahyuono, Zong Yang Kong, Jaka Sunarso, Enhanced Ponceau-4R and Brilliant Blue Degradation using Mesoporous TiO₂ Nanoparticles with Activated Carbon as Support Material, *ChemistrySelect* 2023, 8, e202300534 (1 of 10), <https://doi.org/10.1002/slct.202300534>,
25. **Ernawati, L.**, Laksono, A.D., Parmita, A.W.Y.P., Susanti, D., Qadir, A. (2024). Photocatalytic Reduction of Nitrophenol and Nitrobenzene with Zn Oxysulfide Semiconductor Without Using Reducing Agents. In: Abdullah, H. (eds) *Solar Light-to-Hydrogenated Organic Conversion*. Springer, Singapore. https://doi.org/10.1007/978-981-99-8114-4_1
26. **L. Ernawati**. Distilasi-Absorpsi-Ekstraksi-Leaching: Proses Pemisahan Campuran Pada Industri Teknik Kimia. ISBN: 978-623-02-0384-8. 1-177. published by Deepublish, **2019**. (Buku Ajar).
27. **L. Ernawati**. Dasar Teori dan Terapan Matematika Teknik Kimia. ISBN: 9786230211430. 1-114. published by Deepublish, **2020**. (Buku Ajar).
28. **L. Ernawati**. Fundamental dan Terapan Teknologi Katalis. ISBN: 978-623-02-3147-6. 1-186. published by Deepublish, **2021**. (Buku Ajar).
29. **L. Ernawati**. Kajian Teori dan Konsep Dasar Nanopartikel. ISBN: 978-623-02-4176-5, 1-114, published by Deepublish, **2022**. (Buku Ajar).
30. **L. Ernawati**. Kajian Dasar Adsorpsi dan Difusi Pada Media Berpori. ISBN: 978-623-88389-3-6, 1-135, ITK Press. (Buku Ajar).

INTERNATIONAL CONFERENCES

1. I.K. Maharsih, **L. Ernawati**, Welltina, W. P. Dani. Utilization of sodium silica from coal fly ash and trimethylchlorosilane as self-cleaning coating on glass. International Bioprocessing Association Subject Conference (IBASC 2021), Indonesia. **IOP Conf. Ser. Earth Environ. Sci.** 963 012058, **2022**.
2. **L. Ernawati**, A.W. Yusariarta, R. Alviany, A. Halim. Effect of CaO/SiO₂ compositions on the structure formation of mesoporous calcium silicate (CaSiO₃) composite particles as adsorbent for organic dye removal, International Bioprocessing Association Subject Conference (IBASC 2021), Indonesia. **IOP Conf. Ser.: Earth Environ. Sci.** 963 012008, **2022**.
3. A.W. Yusariarta, A. F. B. Hartanti, **L. Ernawati**, A. D. Laksono, M. I. Zulkarnain, F. A. Fadila. Adsorptive

removal of methylene blue from aqueous solution onto KOH-activated carbons derived from saba banana (*m. acuminata balbisiana*) peels. **IOP Conference Series: Materials Science and Engineering**, Vol. 1053, International Conference on Chemical and Material Engineering (ICCME), Semarang, Indonesia, **2020**.

4. A.D. Laksono, I. Ismail, C.R. Ningrum, Sulistijono, **L. Ernawati**. Mechanical Properties and Morphological Characterisation of Waste Natural Fiber Composites Reinforced Polyester: Gelam (*Melaleuca Leucadendra*). **Journal of Physics: Conference Series**, Vol. 1726, Energy Transition, Smart Technology and Global Environment for Sustainable Development BICAME 3rd ITK, Balikpapan, Indonesia. **2020**.
5. A.A.A. Torimtubun, E. Maulana, A. C. Augusty, **L. Ernawati**. Affordable and Sustainable New Generation of Solar Cells: Calcium Titanate (CaTiO_3)-Based Perovskite Solar Cells. **E3S Web of Conference** 67, 01010, **2018**.
6. **L. Ernawati**, A.A.A. Torimtubun, T. Arofai, A. Yani, T. Huda, R.A. Wahyuono. Polyol Modification of PEDOT/PSS as Hole Transport Material Affects the Performance and Stability of Calcium Titanate (CaTiO_3) Solar Cell and UV Photodetector. **E3S Web of Conference**, 190, 00023, **2020**.
7. **L. Ernawati**, A. W. Yusariarta, A. D. Laksono, R. A. Wahyuono, H. Widiyandari, Rebeka Rebeka, V. Sitompul. Kinetic Studies of Methylene Blue Degradation using CaTiO_3 Photocatalyst from Chicken Eggshells. **Journal of Physics: Conference Series**, Volume 1726, Energy Transition, Smart Technology and Global Environment for Sustainable Development BICAME 3rd ITK, **2020**.
8. **L. Ernawati**, R. A. Wahyuono, A. D. Laksono, A. Ningrum, K. Handayani, A. Sabrina. Wollastonite (CaSiO_3)-based Composite Particles for Synthetic Food Dyes (Brilliant Blue) Removal in Aquatic Media: Synthesis, Characterization and Kinetic study. **IOP Conference Series: Materials Science and Engineering**, Volume 1053, International Conference on Chemical and Material Engineering (ICCME) 6-7th October (**2020**).
9. Abdul Halim, **Lusi Ernawati**, Maya Ismayati, Fahimah Martak, Toshiharu Enomae, Ibrahim Nata Imani, Brigita Cahya Wulandari. Cellulose hydrogel coated fabric as superoleophobic membrane for oily wastewater treatment, *AIP Conf. Proc.* 2818, 090002 (**2023**), <https://doi.org/10.1063/5.0131572>
10. Graham Joanes Minturo, Roslan Noorain, Sharifah Mariam Syed Hitam, Ahmad Shoiful, Mohd Edyazuan Azni, **Lusi Ernawati**, Rosnah Abdullah, Rozyanti Mohamad. Immobilized Nannochloropsis oculata in a down-flow hanging sponge (DHS) reactor for the treatment of palm oil mill effluent (POME). **IOP Conf. Ser. Earth Environ. Sci.** 1017 012024, (**2022**).
11. Arlie Salim, **Lusi Ernawati**, Ade Wahyu Yusariarta, Apip Amrullah. Physical characteristics of developed hybrid briquettes from palm kernel shells/wood sawdust/coffee grounds blends as an alternative energy source. **AIP Conf. Proc.** 2923, 020009 (**2024**). <https://doi.org/10.1063/5.0195484>

SKILLS

1. Scanning Electron Microscopy (SEM; Hitachi S-5000, operated at 20 kV)
2. Zetasizer (Malvern Instruments, Nano ZS, UK).
3. X-ray diffraction (XRD; Bruker D2 Phaser diffractometer equipped with Cu-K α radiation source and a Linx-Eye detector).
4. Brunauer-Emmett-Teller (BET) and Barrett-Joyner-Halenda (BJH) methods, respectively (BELSOR 28SA, Bel Japan).
5. UV-vis spectrophotometer (UV-3150, Shimadzu).
6. Thermogravimetry/Differential Thermal Analysis (TG/DTA).

REFERENCES

1. Prof. Kikuo Okuyama, Department of Chemical Engineering and Applied Chemistry. Hiroshima University. Email: okuyama@hiroshima-u.ac.jp
2. Prof. Takashi Ogi, Department of Chemical Engineering and Applied Chemistry. Hiroshima University. Email: ogit@hiroshima-u.ac.jp
3. Prof. Jui- Hsiang Liu, Department of Chemical Engineering and Material Science, National Cheng Kung University (NCKU). Email: jhliu@mail.ncku.edu.tw
4. Prof. Toshiharu Enomae, Faculty of Life Science and Environmental Engineering. University of Tsukuba. Email: t@enomae.com.
5. Prof. Jaka Sunarso, S.T.,M.E.,PhD. Director Research Center for Sustainable Technologies, Swinburne University of Technology. Email: jsunarso@swinburne.edu.my
6. Prof. Hisao Yoshida, Division of Materials Science, Graduate School of Human and Environmental Studies Kyoto University, Yoshida-nihonmatsu-cho, Email: yoshida.hisao.2a@kyoto-u.ac.jp