



UNIVERSITI
TEKNOLOGI
MARA

Cawangan Kedah
Kampus Sungai Petani

Faculty of Administrative
Science and Policy Studies

i-SPIKE 2021

Leading An Artificial Innovation In Knowledge, Education And Design

i-SPIKE 2021 INTERNATIONAL EXHIBITION & SYMPOSIUM E-PROCEEDINGS

<https://ispike2021.uitm.edu.my/>

e-ISBN 978-967-2948-20-9

Copyright © 2021 is held by the owner/author(s). These papers are published in their original version without editing of the content.

The views, opinions and technical recommendations expressed by the contributors are entirely their own and do not necessarily reflect the views of the Faculty or the University.

Copy Editors : Azni Syafena Andin Salmat, Syazliyati Ibrahim, Asrol Hasan, Nor Zaini Zainal Abidin, Fatihah Norazami Abdullah, Chaleeda Som Sak, Nor Asni Syahriza Abu Hassan & Muhamad Khairul Anuar Zulkepli

Layout Editor : Asrol Hasan

Cover Design : Syahrini Shawalludin

Published by : Universiti Teknologi MARA Cawangan Kedah,
Kampus Merbok,
08400 Merbok,
Kedah,
Malaysia.

TABLE OF CONTENTS:-

i-SPIKE 2021 International Exhibition & Symposium E-Proceedings

NO.	TITLE	PAGE
1.	‘Viewfinder’ Mobile Learning Application for Videography and Cinematography Based on the Rules of Perspective <i>Amir Nor Azan Samar, Harim Izzati Hamdan, Iqbal Jaapar & Muhammad Firdaus Amairudin</i>	1
2.	Systematic Alternative Fuzzy Logic Evaluator (SAFLE) for Student Performance Evaluation <i>Shirley Sinatra Gran, Tracy Adeline Ajol & Awang Nasrizal Awang Ali</i>	8
3.	360 Employees – I <i>Dayang Hazenah Awang Abdul Hamid, Nur Dina Athia Mohd Ramley, Nur Hidayah Jusoh, Nurul Husna Abd Jalil & Mohammad Firdaus Mohammad Hatta</i>	12
4.	AbMTI: Adventure Based Mental Toughness Inventory for Post Covid-19 Pandemic Era <i>Mohd Shariman Shafie, Professor Dato Dr. Md Amin Md Taff, Dr. M.Adli bin Mohd Sidi, Mohamed Azizul bin Mohamed Afandi, Dr. Omar Firdaus Mohd Said & Nik Jazwiri Johannis</i>	18
5.	AbMTM: Post Covid-19 Adventure-Based Mental Toughness Training Model <i>Mohd Shariman Shafie, Professor Dato’ Dr. Md Amin Md Taff, Assoc. Professor Dr. Zuraidah Zainol & Dr. Siti Musliha Mat Rasid</i>	23
6.	Pembentukan Modul Undi18@School untuk Pendidikan Kenegaraan dan Demokrasi kepada Belia 18-21 Tahun <i>Wan Rohila Ganti Wan Abdul Ghapar, Che Hamdan Che Mohd. Razali, Muhamad Fazil Ahmad & Abdul Rahman Abdul Latip</i>	28
7.	A Planning of Templer Forest Park and Templer Forest Reserve through Management Plan <i>Mohammad Zharif Hakimi Mohammad Mazani, Nurul Atikah Mohd Salleh, Muhammad Hafiy Safwan Sahak, Nurul Nabila Che Ahamed, Teeny Valerian, Mohamad Fathi Radhi Ishak, Nor Hanisah Mohd Hashim & Firdaus Chek Sulaiman</i>	33
8.	Administrative Model for Sekolah Agama Rakyat (SAR): Excellence Practices <i>Mohd Nasir Ayub, Nazmi @ Nazni Noordin, Mohd Zool Hilmie Mohamed Sawal & Surita Hartini Mat Hassan</i>	38
9.	ADR-Now Application: Bridging Theoretical and Practical Approach in Alternative Dispute Resolution Process and Procedures <i>Dr. Shahrizal Mohd Zin, Abdul Mu’iz Abdul Razak, Prof. Madya Dr. Nur Ezan Rahmat & Nik Hasbi Fathi</i>	43

10. Agricultural Career Training Program for Drop Out Students through Work Based Learning 47
Marinah Muhammad, Noor Janatun Naim Jemali, Nik Raihan Nik Yusoff & Rozidaini Mohd Ghazi
11. An Eco-Friendly Concrete Blends from Palm Oil Boiler Ash 52
Nurrul Amilin Zainal Abidin, Zeno Michael, Mohamed Khatif Tawaf Bin Mohamed Yusof, Azmi Roslan, Siti Shahidah Binti Sharipudin, Shahrul Nizam Bin Mohammad & Ilya Izyan Binti Shahrul Azhar
12. An Investigation of Clothing for Elderly: Emphasizing Safety, Protection and Functional Attributes 57
Shahrizad Fitri Mustapha, Shuhaila Nahrawi, Rizal Azni Dahaman & Norzaleha Zainun
13. Ardu-Electrochromic Film for Home Safety And Privacy Purpose 65
Anas Akasyah Abd Patas, Nur Athirah Mohd Taib & Syahida Suhaimi
14. Let's Talk about the Movies: The Movie Journal 71
Associate Profesor Dr Norwati Binti Hj Roslim, Associate Profesor Dr Hj, Muhammad Hakimi Tew Abdullah, Ku Nurul Atiqah Ku Ahamad, Nur Faathinah Mohammad Roshdan, Suhaila binti Sharil & Siti 'Aishatul-Humairah Muhammad Fisol
15. Asymmetric Impact of The Oil Price Changes on Stocks Market for Selected Asean Countries 78
Shahiszan binti Ismail, Prof. Madya Dr. Noor Zahirah Mohd Sidek, Fauziah Mohamad Yunus, Jamilah Laidin & Nor Azira Ismail
16. Automated System for Concrete Damage Classification Identification Using Various Classification Techniques in Machine Learning 81
Nur Haziqah binti Mat, Athifa Aisha binti Ahmad Zahida, Siti Nurhaliza binti Abdul Malik, Nur Athirah Syuhada binti Azmadi & Syahrul Fithry bin Senin
17. Automatic Price Scanning System 88
Fahmi Nazreen Zakuan, Anis Diyana Rosli & Nurlida Ismail
18. Al Hijjaei V1 94
Yuslina Mohamed, Mesbahul Hoque, Sulaiman Ismail Nurhasma & Muhamad Saad
19. Infographic of Benevolence Practices: Public Sector's Myth or Reality 100
Dr Nor Zaini Zainal Abidin, Azni Syafena Andin Salamat, Syahrini. Shawalludin, Azlan Abdul Rahman & Dr Siti Norfazlina Yusoff
20. BIO-CHEM KIT: Understanding Biogeochemical Cycles 104
Nurul Hidayana Mohd Noor, Shawal Sahid Hamid@Hussain, Mahazril 'Aini Yaacob & Mohd Hafiz Hazwan Hashim

21.	Biodegradable and Recycle Husk Mailer from <i>Cocos nucifera</i> <i>Anas Firdaus bin Zakaria, Nur Atirah binti Hamzah, Siti Farahin binti Abdull Patah, Wan Zuraida Wan Mohd Zain & Nur' Amira binti Hamid</i>	110
22.	Bunny's Pellet: Natural Mulberry Pellet <i>Nor Dini Rusli, Khairiyah Mat, Hasnita Che Harun, Mohd Mahmud & Syed Muhammad Al-Amsyar Syed Abd. Kadir</i>	114
23.	Cails Paper Wash <i>Aisyah Nur Izzah binti Azhar, Intan Nafissa binti Mohd Jaffri, Loris Anak Noh, Caroline Anak Kiroh & Silverina Anabelle Kibat</i>	120
24.	Capcut <i>Dr Sharifah Shafinaz Sh Abdullah, Nur Afini Azwa binti Roslan, Nur Alya Nabila binti Ashariman, Nur Mazmira binti Mohamad Zuki & Nur Nabila binti Omar</i>	124
25.	Regenerated Kenaf Core Cellulose Hydrogels and Films Prepared via Pre-Cooled Method <i>Adam Khairul Faiz, Muhammad Khairil Hakim Ismail, Hatika Kaco & Mohd Shaiful Sajab</i>	128
26.	Encapsulation of Winged Termites in Cellulose Nanofibre for the Fabrication of Cellulose Bioplastic <i>Syahidatul Nadhilah Shah Lail, Noorul Jannah Aizul Hussin, Hatika Kaco & Mohd Shaiful Sajab</i>	134
27.	Chinese Character Card Game: Learners' Attitudes and Motivation <i>Ting Hie-Ling</i>	140
28.	Coffee Capsule Vending Machine <i>Mohd Sufian Ramli, Siti Sufiah Abd Wahid, Muhammad Hasif Razak & Muhammad Hakimi Md Said</i>	146
29.	Corn-Based Bioplastic as Seedling Bag <i>Nur Nadia Nasir & Siti Amira Othman</i>	151
30.	Coupiers: Course Pre-Registration System <i>Zeti Darleena Eri, Mohd Hanapi Abdul Latif, Mohd Atif Ramlan, Ruhana Jaafar, Sharifah Nurulhikmah Syed Yasin, Hasiah Mohamed & Sarah Yusoff</i>	156
31.	Divorce Protection Takaful <i>Siti Thaqifah Ruzaidy, Siti Adibah Embong, Mohammad Firdaus Mohammad Hatta & Arlinah Abd. Rashid</i>	162
32.	Entrepreneurial Website Project "Www.Businessletter4you.Com" <i>Akmal Syaifudin bin Kaharudin, Siti Zuraina binti Gafar @ Abd Ghaffar & Juritah Misman</i>	168

44. Waste Segregation through Recycle and Composting Activities among the Community in Urban and Suburban Areas 225
Ts. Dr. Norhafezah binti Kasmuri & SitiNurhafizah binti Abdull Razak
45. Ez-Crutches 2.0: An Innovation of Assistive Device for Disabled Person 231
Suzana binti Yusof, Sharifah Shafinaz binti Sharif Abdullah, Fatimah binti Sham & Norhafizatul Akma binti Shohor
46. Facile-Fabricated Foamed Geopolymer Sphere for Heavy Metal Removal from Wastewater 236
Tan Tee How, Mo Kim Hung, Lai Sai Hin & Ling Tung-Chai
47. Finance and Me (*FinME*) – A Digital Learning Tool 242
Carolyn Ann Enchas, Shafinaz Lyana Abu Talib, Fatin Adilah Razali & Norizuandi Ibrahim
48. Fun with Mathematic and Origami: Water Lily Origami 246
Masnira Ramli, Wan Nurul Husna Wan Nordin, Amirah Sa'at & Nurul Fazila Lakasa
49. Fund for Food: A Campus Food Pantry Toolkit to Help Fight Hunger on Campus 252
Nurul Hafizah Mohd Yasin, Nurhaiza Nordin, Nurnaddia Nordin, Nik Noorhazila Nik Mud & Siti Zamanira Mat Zaib
50. Edible Cookie Cup: Cuppa Cookie 257
Raja Nur Hanisah Binti Raja Zainal Alam Shah, Nur Liyana A'tifah Binti Ahmad Jamalulail, Nur Farah Aqilah Binti Mohd Akram, Amara Nazirah Binti Mohd Yusoff & Noorshaadah Binti Omar
51. GTNLARM21 262
Ts. Dr. Sharifah Shafinaz binti Sh Abdullah, Assoc. Prof. Ts. Dr. Zulkifli bin Mohamed , Aisyah Fitriah binti Asmala , Nur Fatimah binti Hanif & Nur Hanisah binti Mahadi
52. Gulali Pandan 267
Amelia binti Zaidan, Ainul Hayati binti Abdull Aziz, Nurul Syamilah binti Ismail, Noristisarah Abd Shattar & Siti Noraisah Dolah
53. Hill Paddy Plough 272
Jasrio Liugan, Sainah binti Melulin, Zurhizainih binti Halledy & 'Umairah Abd Khalid
54. Historic Interior Scheme (HIS) Conservation Framework for Heritage Museum Building in Malaysia 275
Norashikin Abdul Karim, Siti Norlizaiha Harun, Salwa Ayob & Zulkarnain Hazim

55.	I-Poket Perumahan: Panduan kepada Newbie <i>Mahazril 'Aini Yaacob, Nurul Hidayana Mohd Noor, Hafizah Hammad Ahmad Khan, Zuraini Yaacob & Farah Amirah Fuad</i>	283
56.	Development of HVAC Virtual Laboratory (HV-Lab Version 1.0) <i>Mohd Faez bin Zainol, Ts. Shikh Ismail Fairus bin Shikh Zakaria & Dr. Muhammad Zulkarnain</i>	287
57.	i-Care2u: Easy-To-Use Application Software to Enhance Knowledge and Awareness of Malaysians towards the Rights of Persons with Disabilities <i>Muhammad Fikri Othman, Nur Ezan Rahmat, Norazlina Abdul Aziz, Nora Abdul Hak & Diyana Kamarudin</i>	293
58.	Immersive Learner's Usability and Experience through VMMBG during Covid-19 Pandemic: An Evidence of a Higher Educational Institution <i>Shahreena Daud, Idris Osman, Zarinah Abu Yazid, Norraeffa Md Taib & Amirudin Mohd Nor</i>	297
59.	VCDDT: The Virtual Classroom Debate Tutorial Approach <i>Azlyn Ahmad Zawawi, Junaida Ismail, Irwana Nooridayu Mohd Hakimi Noorayuni Rusli & Intan Syahriza Aziz</i>	304
60.	Indikator Teknik Pengajaran Bahasa Arab di UiTM Menerusi Teknologi <i>Nurul Asma Mazlan, Suhaila Zailani @ Ahmad, Zamri Arifin, Mohd Faizulamri Mohd Saad & Nur Aqilah Norwahi</i>	307
61.	Inquiry-Based Reciprocal Teaching Module <i>Ting Pick Dew, Suyansah Swanto & Vincent Pang</i>	311
62.	Instant Beef Stew <i>Nursyadah binti Nordin, Norhidayah bt Abdullah & Muna Shakirah bt Mohamad</i>	316
63.	Integrated Solar-IoT Monitoring and Predictive Maintenance Systems for Irrigation (S-IoTP) <i>Hasyiyya Karimah Adli, Ku Azmie Ku Husin, Khairul Nizar Syazwan Wan Salihin Wong & Muhammad Akmal Remli</i>	320
64.	IOT Based Monitoring System for Oyster Mushroom Farming Pondok Seri Permai Pasir Putih Kelantan <i>Muhd Azhar Bin Zainol, Sh Mohd Firdaus Bin Sh Abdul Nasir, Nor Suhada Binti Abdullah, Koay Mei Hyie, Siti Nur Amalina Binti Mohd Halidi, Hazimi Bin Ismail & Lesairuamin Bin Leiah</i>	325
65.	IoT Based Water Leakage Monitoring System <i>Muhammad Azfar Shazmi Mohd Adnan & Zulkifli Mohamed</i>	334
66.	i-Tabung <i>Dayang Aniisah Mardhiyyah binti Abg Borhanuddin, Mohamad Nornashriq Irfan bin Nordin, Muhammad Akram bin Nazri, Muhammad Azwar Naim</i>	340

bin Amilan, Muhammad Fadhillah bin Mohd Zam Zam, Mohd Fazly bin Mohd Razali & Ima Ilyani binti Dato' Hj. Ibrahim

- | | | |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 67. | <p>Kaedah Pengajaran CHM510: Dari Sudut Pandang Pelajar
 <i>Sheikh Ahmad Izaddin Sheikh Mohd Ghazali, Nur Nadia Dzulkifli, Nor Monica Ahmad, Jamil bin Mohamed Sapari, Ahmad Husaini Mohamed & Nurul Nadthira binti Che Awang</i></p> | 343 |
| 68. | <p>Ke Arah Kelestarian Kebun Komuniti dalam Usaha Menyantuni Golongan B40
 <i>Intan Syafinaz Mat Shafie, Yuslina Liza Mohd. Yusof, Nor Irvoni Mohd Ishar, Maryam Jameelah Mohd Hashim, Mohd Fairus Kholid, Muhammad Yasin Ramadhan Zahari & Sharidatul Akma Abu Seman</i></p> | 348 |
| 69. | <p>Uniqeicare Takaful
 <i>Muhammad Sa'di Bin Mohd Saman, Nur Aimi Binti Abdul Azis, Mohammad Firdaus Bin Mohammad Hatta & Azlina Binti Hanif</i></p> | 353 |
| 70. | <p>#Kitajagakita: The Manifestation of Modern Jewellery Design
 <i>Mohd Faiz Jalaludin, Mohd Hakim Mohd Sharif, Adib Mohd Hasan & Muhammad Shafiq Muda</i></p> | 359 |
| 71. | <p>Kombu-Feed: A Nutritive & Prophylactic Alternative for Fish Production
 <i>Ruhil Hayati Hamdan, Tan Li Peng, Nora Faten Afifah Mohamed, Ain Auzureen Mat Zin & Ahmad Syazwan Samsuddin</i></p> | 363 |
| 72. | <p>Kriging Interpolated Rainfall Data in ArcGIS for a Sustainable Flood Modelling Prediction
 <i>Fahda Nurhani Ahmad Razan, Nur Fatim Nasuha Mhd Khatif & Ir. Nur Azwa Muhamad Bashar</i></p> | 368 |
| 73. | <p>Kuasai Rintas: Penulisan Ringkasan Bahasa Melayu Yang Lengkap
 <i>Gladys Sebi binti Entigar, Noor Haty binti Noor Azam, Milfadzhilah binti Mohd Jamil, Roziana binti Ahmed & Nur Elimtiazh bin Abidin</i></p> | 373 |
| 74. | <p>Landscape Architecture Design Studio-Based Using Process-Evaluation Model in Open Distance Learning
 <i>Masbiha Mat Isa, Alamah Misni & Faridatul Akma Ab Latif</i></p> | 378 |
| 75. | <p>LiBCO
 <i>Noryana binti Ahmad Khusaini, Nur Hasni binti Nasrudin, Mohd Shamsul bin Daud, Noraini binti Abd Rahman, Rosida binti Ahmad Junid & Siti Fairuz binti Ibrahim</i></p> | 382 |
| 76. | <p>Limit of Acceptable Change and Recreation Opportunity Spectrum as a Tool in Developing a Management Plan. A Study in Templer Forest Eco Park & Templer Forest Reserve</p> | 388 |

<p><i>Syahidah Hanani Hamdan, Nur Sabrina Sabri, Muhammad Hazim Zakaria, Khairul Asri, Syanizatul Izreen Kamal, Nor Asma Safuraa Roslan, Ely Rouzee Jamaluddin & Nawfal Kamarul Bahrain</i></p>		
77.	<p>Tweet It! EsL Writing Activity Module Using Twitter <i>Nurshahirah Azman & Zaemah Abd Kadir</i></p>	393
78.	<p>Malaysian Secondary Boarding School Menu Planning System <i>Suliadi F. Sufahani & Anuar M. Yusof</i></p>	399
79.	<p>Malaysian Studies Pocket Read <i>Ani Juaini Bahrin, Farhana Yaakub, Firdausi Sufian (Dr), Nurfaizah Abdullah & Saiful Zizi Jalil</i></p>	405
80.	<p>Mathematical Thinking Enhancement Program (MaTh-EP) <i>Nurul Akmal Md Nasir, Parmjit Singh & Geethanjali Narayanan</i></p>	410
81.	<p>Medicine Reminder With Low Battery Alert “MEDMINDER” <i>Syahirah Asyiqin Binti Alias, Luqman Hakim Bin Fazilah Shuhaimi, Khairin Farhana Binti Kharul Anuar, Muhammad Firdaus Bin Mangsor & Suhana Sulaman</i></p>	418
82.	<p>Meow-Meow Food Dispenser Using Internet of Things (IOT) Programme <i>Nor Diyana Md Sin, Saifaris Azizi Saiful Azam, Muhamad Danial Osman, Mohamad Zhafran Hussin, Norbaiti Sidik, Khairul Kamarudin Hasan</i></p>	424
83.	<p>Mesin Penapis Turpentin Turpentine Filter Machine (TFM) <i>Hairulnisak binti Merman, Muhammad Salehuddin bin Zakaria, Aiman Yusri bin Mohamad Yusoff, Aimi Atikah binti Roslan & Azian binti Tahir</i></p>	429
84.	<p>Mind Your Right Booklet: Awareness on Cyber Defamation Law & Media <i>Suria Fadhillah Md Pauzi, Musramaini Mustapha, Azniza Ahmad Zaini, Suhanom Mohd Zaki & Mohd Aidil Riduan Awang Kader</i></p>	434
85.	<p>Modelling the Effectiveness of Using Online Food Delivery Services Apps Among Customers in Klang Valley During Covid-19 Pandemic <i>Prof Madya. Dr Rozita Naina Mohamed, Mohd Saifullah Bin Rusli & Prof.Madya. Dr.Halimahton Borhan</i></p>	440
86.	<p>The Innovation Process Modelling for Ethanol Gas Sensing Using Artificial Neural Network <i>Muhammad Afiq Wazini bin Jemani, Vicinisvarri Inderan, Syahrul Fithry bin Senin, Norain Binti Isa & Lee Hooi Ling</i></p>	447
87.	<p>The Effectiveness of i-Lab v2 as a Teaching Tool for Online Distance Learning <i>Nur Zaidani Wati binti Mohd Darwis, Noor Raifana binti Ab Rahim, Narita binti Noh & Juwita binti Asfar</i></p>	453

88.	My Ecredit Banking Apps (MECBA) V3 <i>Wan Razazila Wan Abdullah (Dr), Enny Nurdin Sutan Maruhun (Dr), Norzarina Nordin, Sunarti Halid & Ahmad Saiful Azlin Puteh Salin (Prof. Madya Dr)</i>	459
89.	The Dynamics of MILO (Multimedia Interactive Learning Online) in Role Playing: Enhancing the Learning Process in Covid-19 Pandemic <i>Woo Pak Yuan, Nina Farisha binti Isa & Ezwani Azmi</i>	464
90.	The Continuance of External Review Information System Adoption In Malaysia <i>Mohd Norafizal Abd Aziz, Razulaimi Razali, Nik Rosli Abdullah & Shahrul Azam Abdullah</i>	470
91.	Understanding Islamic Finance Concepts through Innovative Game: Name The Riba Transaction! <i>Azilawati Banchit, Puteri Faida Alya Zainuddin & Lai Tze Wee</i>	479
92.	Natmag Cleaner (Natural Magnificent Cleaner) <i>Hani Hasriena binti Hasrin, Muhammad Firdaus bin Ahmad Nizam, Nur Amalin Batrisya binti Ujud, Deeny Robeatul Adawiyah binti Khairul Anuar & Norzalina binti Jenal</i>	484
93.	New Fundamental Theory in Solving the Royalty Payment Problem <i>Wan Noor Afifah binti Wan Ahmad & Suliadi Firdaus bin Sufahani</i>	489
94.	Notebookly (A Pageless Notebook) <i>Aimi Natasha binti Rujha, Amani binti Mohamad Soree Awankasim, Muhammad Faiz bin Abdul Hamid & Nur Dania Syahirah binti Mohd Asri</i>	492
95.	Nutritious Digital Menu System for Malaysian Religious Primary School Children: Improving Good Memories <i>Azila M. Sudin, Suliadi F. Sufahani & Mohd A.A. Abdullah</i>	495
96.	Online Games for Learning Lewis Structure <i>Wan Elina Faradilla Wan Khalid, Tuan Sarifah Aini Syed Ahmad, Nor Akmalazura Jani, Rohaiza Saat & Nurazira Mohd Nor</i>	501
97.	Optimal Charging Schedule of Electric Vehicles Using Evolutionary Programming to Minimise Costs <i>Hasmaini Mohamad, Norhasniza Md Razali, Ahmad Farid Abidin, Nur Ashida Salim & Zuhaila Mat Yasin</i>	506
98.	The Smart Attendance of Microsoft Team (SAMT 2021) in an Online Learning Classroom <i>Wan Normila Mohamad & Zahari bin Md Rodzi</i>	511
99.	Penelitian Terhadap Kepelbagaian Fungsi Bandar Kecil Terhadap Penduduk Setempat di Gemas, Negeri Sembilan <i>Natasya Farhana Nazry, Jabil Mapjabil & Farzanna Yashera Abdulla</i>	521

100. Penentuan Kaedah Mengukur Kesanggupan Untuk Membayar (WTP) Dalam Pelancongan 525
Nabila Farysha Dering & Jabil Mapjabil
101. Penentuan Kecenderungan Tingkah Laku Pelancong yang Berkunjung ke Kota Kinabalu – Psikosentrik dan Alosentrik 531
Farzanna Yashera Abdulla , Jabil Mapjabil & Natasya Farhana Nazry
102. Penentuan Kuasa Beli Pengunjung terhadap Perkhidmatan Pelancongan Terpilih di Bandaraya Kota Kinabalu, Sabah 535
Nurul Izzah Ismail & Jabil Mapjabil
103. The Artificial Neuron Network for Photocatalytic Degradation of Acid Orange 7 Using Cerium Oxide (CeO₂) 539
Wan Nur'ain Awanis binti Wan Sa'ari, Vicinisvarri Inderan, Syahrul Fithry bin Senin & Nur Fadzeelah Abu Kassim
104. Perception of Digital Reading Material for Academic Purposes among UMK Undergraduates 544
Noor Syamimie Mohd Nawi, Lena Ramamurthy, Syakirah Shafien, Suhaida Omar & Nik Ahmad Farhan bin Nik Azim
105. Perception of Language Awareness through Framagram: A Classroom Example 548
Nik Ahmad Farhan bin Azim @ Nik Azim, Lena A/P Ramamurthy, Syakirah binti Shafien, Noor Syamimie binti Mohd Nawi & Shahidatul Maslina binti Mat So'od
106. Perkasa @ Aps : Solusi kepada Kerapuhan Keluargayang Mempunyai Anak Cerebral Palsy 552
Wan Rohila Ganti binti Wan Abdul Ghapar, Muhamad Fazil Ahmad, Norhashimah Yahya & Rahaya Mat Jamin
107. Poket Peka Undang-Undang Dilettante V2:Pemberhentian Kerja 556
Suria Fadhillah Md Pauzi, Muhammad Asyraf Azni, Suriyati Ujang, Azniza Ahmad Zaini & Ida Rosnita Ismail
108. Power Generation Using Thermoelectric Power Generator with Parabolic Solar Concentrator 562
Aneurin Nanggar anak Nyandang, Ir. Dr. Ts. Baljit Singh A/L Bhathal Singh & Dr. Muhammad Fairuz bin Remeli
109. Prediction of Nanostructure of SnO₂ Properties Using Artificial Neural Networks 565
Khadijah binti Mohd Suhami, Vicinisvarri Inderan, Syahrul Fithry bin Senin & Lee Hooi Ling
110. Product Development - e-Ta'awun PA Takaful+ 570
Mohd Faizan bin Mohd Afandi, Norazrisham bin Shamsuddin ,Muhamad Izmul Nizam bin Zubairi , Mohammad Firdaus bin Mohammad Hatta & Mohamad Nizam bin Jaafar

111. Promoting Malayan Emergency State by Using Gaming Platform as An Illustrative Medium 577
Mohammad Nor bin Anwar Hussin
112. ProTecME 583
Rosuzeita Fauzi, Syazwan Firdaus Abu Bakar, Roslinda Isa, Siti Nor Ismalina Isa, Diana Tasha Mohd Nazeri
113. Protein as the Building Blocks of Life 587
Rania Farzana binti Azmi, Azleen Nurkarmilya binti Azami, Nur Shafinaz binti Mohamad Salin & Wan Mazlina Md Saad, PhD
114. Pull Up Crisp Container 589
Mohamad Firdaus bin Shaari, Kamarul Asyraf bin Shamsudin & Nurul Fatimah binti Mohamad Azmi
115. RE Protect-i 592
Mohd Azeem bin Ahmad Zaini, Farid Akmal bin Fadzli, Mohd Saiful Izzat bin Mat Zahari, Wahida binti Ahmad & Mohammad Firdaus Mohammad Hatta
116. ReProDB Web Application (Research Project Database) 598
Jennifah Nordin, Afida Arapa, Ibiاناflorinciliana Niane Anthony Aning & Intan Syahriza Azizan
117. Rizbrunana: Advances in High-Fibre Biscuit Using Brown Rice and Banana Peel 609
Nurul Hafizah Mohd Yasin, Derweanna Bah Simpong, Nur Farihin binti Abd Hadi Khan & Mazne Ibrahim
118. Ready-To-Bake (RTB) Cookie Dough 615
Muna Shakirah Bt Mohamad, Norhidayah Bt Abdullah & Nursyadah Bt Nordin
119. RTGreenmFUND: Sejauhmanakah Keberkesanannya dalam Pengurusan Dana Ruang Terbuka Hijau Bandar 618
Nabilaa Mohamed, Thenmolli Vadeveloo, Zarina Mohd Zain & Roni Ekha Putera
120. TCD (Table Connector Design) 622
Ramlan Mustapha, Maziah Mahmud, Surita Hartini Mat Hassan, Siti Norma Aisyah Malkan & Nurul Hidayah Che Hassan
121. Self-Practice Ringkasan (SPRing): An Innovative Mobile Apps for Self-Practice 629
Asmahani Mahdi, Zubaidah Bohari, Abdul Hadi Abdul Talip, Nurul Lizzan Kamarudin & Zainon Haji Bibi

122. Revitalising Heritage Shophouses of Kota Bharu Kelantan 633
Yasmin Mohd Faudzi, Najah Md Alwi, Nor Hafizah Anuar, Juliza Mohamad & Nik Nurul Hana Hanafi
123. Smart 3-Wheel Bike “Empower Disabled Entrepreneurs With Technology” 638
Nurnaddia Nordin, Nurhaiza Nordin & Nur Ilyana Amiira Nordin
124. Takaful Sinar Ihsan Plus 642
Nur Adibah binti Ab Aziry, Erlyn Marlina binti A.Rahman, Nurul Izzaty binti Mohamad Ridzuan & Mohammad Firdaus Mohammad Hatta
125. Smart Keychain 648
Mohd Hifadzly bin Husrin, Adeylson Ray Douni, Muhammad Azlan bin Moh Sali & Edrin Rosley
126. Secured Multi Door Access System as A Web Application 652
Nor Shamshillah Kamarzaman, Norhayati Abdul Jamil, Noraliza Azizan, Jaaz Suhaiza Jaafar & Muhamad Syafiq Ahmad Nazri
127. Standard of Care Framework for Occupier During Pandemic Covid-19 (SOCO): A Facilitation for Understanding Law Relating to Tourism Industry 657
Mohamad Sahizam Musa, Suria Fadhillah Md Pauzi, Shamsinar Abdul Rahman, Mohd Azim Zainal & Ida Rosnita Ismail
128. Development Of Sound System Level Tools “SoQMeT” 664
Muhammad Danial bin Abu Hanafiah, Muhammad Aleef bin Mohamad Yaziz, Muhammad Aiqal bin Mohd Sazali, Adhilla binti Ainun Musir, Nurulzatushima binti Abdul Karim & Daliah binti Hasan
129. Stackable Pinewood Pallet Storage Keeper (SPPiKe) 670
Nurrohana Ahmad, Hazlin Hasan, Sharifah Norhuda Syed Wahid, Mohd Aidil Riduan Awang Kader & Mastura Mohamad
130. Sustainable Hybrid G-W Filter 676
Nur Fatin Nasuha Mhd Khatif, Fahda Nurhani Ahmad Razan, Ir. Nur Azwa Muhamad Bashar & Nurakmal Hamzah
131. Takaphone Takaful 681
Muhammad Waizzulhakim bin Othamannor, Mohd Mazwan bin Mohd Jamil, Mohammad Firdaus bin Mohammad Hatta & Sharifah Faigah binti Syed Alwi
132. Stay@Rural Application 686
Muhammad Faezzul Farhan bin Yazid, Muhammad Hakim Zulqarnain bin Ajis, Mohamad Sazlyzam bin Ledei Dawin@Salim Dawin, Mohd Ashnawi bin Ab Gani & Dr. Spencer Hedley Mogindol

133. Sajadah Pillow 689
Nor Asyiqin Nadhirah binti Roslee Afendi, Sharifah Hafiza binti Abu Bakar, Nur Khaleqa Izzah binti Ikmal Hisam & Siti Hajar binti Md Shahar
134. Pepper Casenitizer 693
Nurfatihah Syahirah binti Zaidi Rahimy, Syahira Nisha Nabila binti Mohamad Shahril, Muhammad Afiq Syahmi bin Rosli, Nur Wani Syamimi binti Yaman & Alvin Gatu
135. My_Watch - Changing the Way We Use Watches 699
Nur Athilla binti Alimin, Nur Hadirah Faqihah binti Zainudin, Siti Nadiah Afiqah binti Suhairi, Joseph Joshua Rumpungan Jr & Adrianna binti Aziz
136. Myeco Application 704
Izz Fitri bin Hairul Sham, Nur Syahirah binti Dzulkarnain , Rosseryn Soubin Lonsiong & Siti Zuraini binti Ramley Alan
137. Multipurpose Pushcart 709
Farah Adlyna Yeoh , Noor Zizy Ameleena binti Jailani , Nur Amiratul Atiqah binti Nur Azli Yaacob & Sairah Saien
138. Multipurpose Handle Stabilizer – To Help You Handle Your Life 714
Nur Athilla binti Alimin, Nur Hadirah Faqihah binti Zainudin, Siti Nadiah Afiqah binti Suhairi, Joseph Joshua Rumpungan Jr & Adrianna Aziz
139. The Travel Amenity Pod 719
Wan Nuramalin binti Wan Hussin, Nur Alissya binti Nazri, Muhammad Takbir bin Arifuddin & Ahmad Fareez bin Yahya
140. Toothbrush 2-In-1 724
Alice Evana Anak Robert, Latijah Obaun, Staffy Stephen & Christy Bidder
141. Torch Bottle 727
Muhammad Shazwan Puzi, Farzana Suaidah binti Suzaini, Nurul Aina Balqis binti Mohd Khairul Anuar & Nur Murniza binti Mohd Zaidi
142. Tourism Application - Touch 731
Siti Hafizah binti Dzulkarnain, Amira Naqiyyah binti Mustaffa Ma'arof , Nursyahidah binti Hamzah, Nur Hidayah binti Mohammad Hazlan & Boyd Sun Fatt
143. Locallah 736
Muhammad Faliq Aizat M.Amran, Nazmeen Fatima binti Istekhar Ahmad, Nur Izzati Nabilah binti Alias, Adriana binti Mohamad Faizal & Mohd Arsy Ardy bin Mohd Hardy
144. Ez-Train Mobile App 741
Siti Aishah binti Sha'ari, Alirah Itor, Muhammad Faizzudin bin Mohd Shukor, Nur Hazeera binti Madehie & Nurafiqah binti Mohamad Musa

145. Eventgo 747
Cassandra Grace anak Hamarah, Nazira Farahin binti Nazarudin, Venessa Kumang Amen anak Victor Luna & Cindy Johnny
146. Duo-Bottle 752
Maybelyna Deborah Dick, Nurashikin Binti Hamzah, Jacqueline Henry & Nurafiqah Binti Mohamad Musa
147. 4 In 1 Safety Kit 755
Nur Maisarah Afiqah binti Mazlan, Aina Afriena binti Afandi, Aida Najihah binti A.Lukman, Muhammad Irfan bin Mazlan & Nur Murniza binti Mohd Zaidi
148. Augmented Reality Design: The Study of Property Development Marketing Tools 761
Norzaful Anuwar bin Ahmad Najamuddin
149. SMART Hygiene Kit 765
Dg Kamisah Ag Budin, Jasmine Vivienne Andrew, Faiqah Mawardi, Mohammad Firdaus bin Mohamad & Dayang Haryani Diana Ag Damit

ENHANCED MICROWAVE HEAT SUSCEPTOR CRUCIBLE

Assoc. Prof. Dr. Muhammad Azwadi Sulaiman
Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan
azwadi@umk.edu.my

Fathin Asila Mohd Pabli
Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan
fathin_pabli@yahoo.com

Syifa' Muhamad Sharifuddin
Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan
syifasharifuddin96@gmail.com

Assoc. Prof. Dr. Julie Juliewatty Mohamed
Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan
juliewatty.m@umk.edu.my

Dr. Norfadhilah Ibrahim
Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan
nfadhilah@umk.edu.my

ABSTRACT

Microwave (MW) irradiation is an attractive technique of material processing. Reasons for the growing interest in the use of microwave energy are including rapid heating, enhanced densification rate, decreased sintering active energy and improved microstructure. MW heating also has the potential for energy and cost savings when comparing with conventional heating. The use of microwave in ceramic processing is a relatively recent development. The technique can be applied effectively and efficiently to heat and sinter ceramic object. In this study, the microwave heat susceptor crucible was formulated and enhanced to convert the microwave energy to heat at very high efficiency. The performance was surpassing the existing product in market and the invention was patented for commercialization.

Keywords: microwave heating, susceptor, advanced ceramics, sintering

INTRODUCTION

Energy consumption is vital in current manufacturing industry, and it is an ongoing attention to reduce the energy and increase the production at the same time. Heating processes in producing products is unavoidable which involve temperature from low such food manufacturing to very high in metal forming as example. This also become extremely high in ceramic processing and consume extremely high energy. In another way, controlling high heat is very difficult due to the nature of this energy type is easy to dissipate and lost the the environment. Recent heating method known as microwave heating is a promising technique due to very efficient and renewable. The microwave energy can be converted to heat energy using susceptor materials and this is like heating filament in electric heating but the efficiency of susceptor materials in microwave heating is much better. Low temperature processing such

as food products, the heating process is conducted by the products itself known as self-heating. But high temperature materials processing such as ceramic, the self-heating for synthesis of ceramics is the insufficient. This can be solved by using high and efficient crucible susceptor materials to produce additional more heat. Commercially, SiC susceptor is used but in ceramic processing, it is not enough to produce required heat to synthesis ceramic. In this research, special formulated chemical were done to produce very high heat and suitable for ceramic processing.

Synthesis of Ceramic

The enhanced susceptor crucible was used in microwave to synthesis $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$ from CaCO_3 , TiO_2 , CuO precursor (Zaman et al., 2016). Figure 1 shows the XRD pattern of sintered CCTO pellets at different microwave irradiation time. All of the sintered pellets that calcined at different microwave irradiation time obtained CCTO and TiO_2 (Rutile). There is the highest peak obtained by sintered pellet calcined in 7 hours with a low residue of TiO_2 (Rutile) which is nearly forming single-phase CCTO. As the microwave irradiation time in calcination increases, the CCTO composition in the sintered pellets increase. This good trend is shown for the calcined powder from 1 to 7 hours. The trend shows that the microwave irradiation promotes the production of CCTO composition as time increases. However, there is a drop of CCTO composition in 9 hours since the pellet have already entered secondary phase as it melted, resulting the produced CCTO composition have turned into CuO (tenorite) (Hutagalung et al., 2009). To conclude, the highest percentage of CCTO composition with 98wt% is found in the sintered pellets that calcined in 7 hours. However, the CCTO produced is still not completed due to the presence of 2wt% of TiO_2 (Rutile).

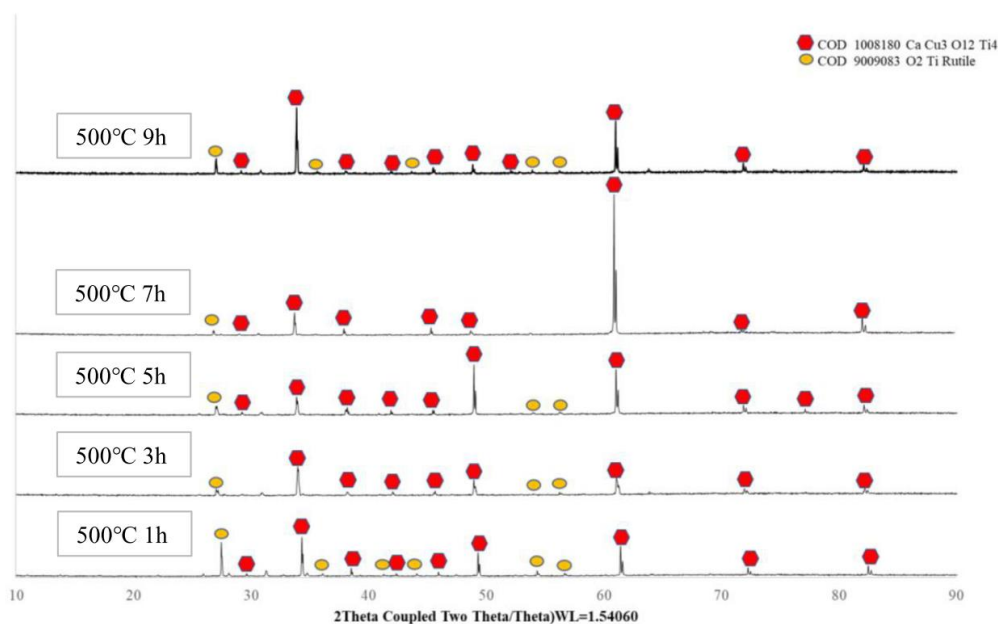


Figure 1 : XRD Pattern of sintered CCTO pellets at 1040°C for 10h of the sample calcined at different microwave irradiation time (1h, 3h, 5h, 7h, and 9h) in 500°C (Na et al., 2020).

Figure 2 the surface microstructure of sintered CCTO pellets at 1040°C for 10 hours from calcined powder at different irradiation time was evaluated by using SEM under 1000× magnification which operated in 10 kV. As observed, the amount and grain size of CCTO increases significantly with the increasing of calcination time. The grain growth of CCTO particles and the microstructural densification was promoted by increasing the calcination time as the diffusion process had enough time for CCTO particles to grow for joining together hence reduce the grain boundaries and reduce the porosity of CCTO pellets

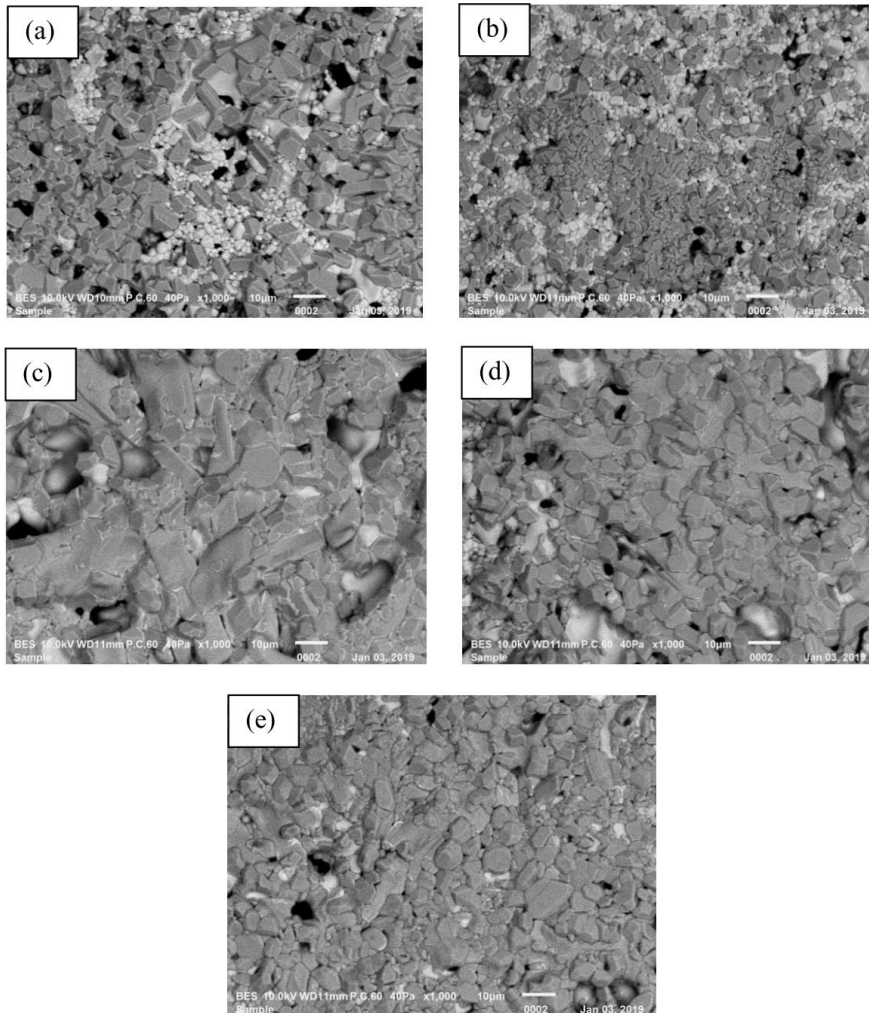


Figure 1 : Surface Morphology on sintered CCTO pellets that calcined at different microwave irradiation time which are (a) 1h, (b) 3h, (c) 5h, (d) 7h and (e) 9h (Na et al., 2020)

CONCLUSION

Enhanced microwave susceptor crucible produced is capable to generate enough heat and

produce ceramic as proven in the XRD testing. Based on the XRD analysis, the phase of CCTO was successfully with minor residue of constituent materials. The highest percentage of CCTO composition is found in the sintered pellets calcined in 7 hours, which is 98wt%. However, the CCTO is still not completed due to the presence of 2wt% of TiO₂ (Rutile). For the surface morphology of CCTO pellets, as the calcination time and temperature increased, the amount and particle size of CCTO particles also increased, resulting the diffusion process had more time duration to generate energy for grain growth and hence the grain boundaries and porosity can be reduced. The result also has proven that the enhanced SiC-based susceptor can improve the microwave processing more effectively at the same time duration compared to commercial SiC susceptor. For dielectric properties at 1 MHz, the dielectric constant and the dielectric loss increase with the increasing of the microwave irradiation time for calcination, due to the effect of the weakening of space charge polarisation.

ACKNOWLEDGEMENTS

The authors would like to acknowledge Centre for Postgraduate Studies UMK, and Malaysian Higher Institute for funding grant through FRGS with grant code - R/FRGS/A0800/00644A/003/2018/00557

REFERENCES

- Hutagalung, S. D., Ooi, L. Y., & Ahmad, Z. A. (2009). Improvement in dielectric properties of Zn-doped CaCu₃Ti₄O₁₂ electroceramics prepared by modified mechanical alloying technique. *Journal of Alloys and Compounds*, 476(1–2), 477–481. <https://doi.org/10.1016/j.jallcom.2008.09.025>
- Na, T. W., Pabli, F. A. M., Sharifuddin, S. M., Nor, M. S. M., Wan Ali, W. F. F., & Sulaiman, M. A. (2020). Effect of calcination time on the microstructure and dielectric properties of CaCu₃Ti₄O₁₂ using enhanced microwave processing. *Malaysian Journal of Microscopy*, 16(1), 83–93.
- Zaman, R. A., Abu, M. J., Ab Karim, S., Mohamed, J. J., Ain, M. F., & Ahmad, Z. A. (2016). Synthesize CCTO using different mixing media. *Materials Science Forum*, 840, 87–90. <https://doi.org/10.4028/www.scientific.net/MSF.840.87>



Cawangan Kedah
Kampus Sungai Petani

Faculty of Administrative
Science and Policy Studies

i-SPiKE²⁰²¹

INTERNATIONAL EXHIBITION & SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

Leading An Artificial Innovation In Knowledge, Education And Design

e ISBN 978-967-2948-20-9



9 7 8 9 6 7 2 9 4 8 2 0 9