

**DEVELOPMENT OF AN ESP32-BASED PYROLYSIS REACTOR WITH
FUZZY LOGIC TEMPERATURE CONTROL**

By

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BACHELOR'S DEGREE / MASTER'S DEGREE
in

MECHATRONICS ENGINEERING FACULTY OF ENGINEERING &
INFORMATION TECHNOLOGY



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I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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ABSTRACT

DEVELOPMENT OF AN ESP32-BASED PYROLYSIS REACTOR WITH FUZZY LOGIC TEMPERATURE CONTROL

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Plastic waste is a problem in this era. polyethylene terephthalate (PET), in particular, continues to increase in line with household consumption of plastic-based products. Pyrolysis, as an alternative to recycling by thermochemical conversion method, offers a potential solution to convert PET plastic waste into valuable products, namely by converting PET plastic waste into oil. This research focuses on developing a thermochemical system named efficient and controlled pyrolysis process for oil production from PET waste using ESP32 microcontroller platform. by monitoring and controlling the temperature in real-time, to ensure stability in the process and product quality. The developed pyrolysis system was tested with the parameters set by the microcontroller, to see how much the temperature varies to get a satisfactory product quality. The results show that the developed system can produce pyrolysis oil from PET waste with characteristics that are promising for vehicle fuel. With the right temperature control, this system offers a sustainable and efficient approach to reduce the environmental impact of PET plastic waste and produce valuable products.

keywords: Pyrolysis, PET Waste Conversion, Electric Furnace, Temperature Control, Syngas, Bio-Oil.



DEDICATION

I dedicate this work for the future research of engineering



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TABEL OF CONTENT

	page
STATEMENT BY THE AUTHOR.....	2
ABSTRACT.....	3
DEDICATION.....	5
ACKNOWLEDGEMENTS.....	6
TABEL OF CONTENT.....	7
LIST OF FIGURES.....	10
LIST OF TABLES.....	12
CHAPTER 1 - INTRODUCTION.....	13
1.1 Background.....	13
1.2 Research Problems.....	14
1.3 Research Objectives.....	14
1.4 Significance of Study.....	15
1.5 Research Questions.....	15
1.6 Hypothesis.....	15
1.7 Limitation.....	16
CHAPTER 2 - LITERATURE REVIEW.....	17
2.1 Polyethylene Terephthalate (PET).....	17
2.2 Heat transfer.....	17
2.3 Heat Capacities.....	18
2.4 Heat Conduction.....	18
2.5 Law of Thermodynamics.....	18
2.6 Energy Balance with Phase Change.....	20
2.7 The Log Mean Temperature Difference (LMTD).....	20
2.8 Pyrolysis Process.....	21
2.8.2 Fast pyrolysis.....	21
2.8.3 Flash Pyrolysis.....	21
2.9 Pyrolysis Cracking Process.....	22
2.9.1 Thermal cracking.....	22
2.9.2 Catalytic cracking.....	22
2.9.3 Catalytic Hydrogenation Cracking.....	22
2.10 Energy Balance with Phase Change.....	23
2.11 Fuzzy Logic Control System.....	23
2.12 Moving Average Filter.....	24
2.13 Previous Studies.....	24

2.13.1 Design Reactor	25
2.13.2 Heating system Reactor	26
2.13.3 Temperature Monitoring Reactor	27
CHAPTER 3 – RESEARCH METHODS	29
3.1 Research Framework	29
3.1.1 Determine Objective and Literature Review	29
3.1.2 System and Design Requirements	29
3.1.3 Design and System Overview	30
3.1.4 Reactor and System Development	30
3.1.5 Data Testing and Evaluation	30
3.1.6 Data Collection and Analysis	30
3.1.7 Conclusion	31
3.2 Design Justifications	31
3.2.1 Selection of Internal Reactor Material	31
3.2.2 Heat Absorbed by Plastic PET Bottles	31
3.2.3 Heat Transfer Reactor	38
3.2.4 Diameter and High Reactor	39
3.2.5 Heat loss	40
3.2.6 Energy to heating up the chamber	40
3.2.7 Inject the nitrogen inside the chamber to clean the oxygen	42
3.3 System Requirement Justification	44
3.4 Materials	46
3.4.1 AC Plug 16 Watt AC Plug 16 Watt	46
3.4.2 Ball Valve 1/2-inch Onda	47
3.4.3 Ceramic Fiber blanket	47
3.4.4 Ceramic Heater 1000W 230V 750°C	48
3.4.5 Earth Leakage Circuit Breaker (ELCB) 230V 32A / EFET ELCB 2 Pole	48
3.5.6 ESP32 USB-C Development Board Dual Core ESP-32S Board WROOM	49
3.5.7 Heat Sink for SSR	49
3.5.8 Kabel NYM Tunggal 2 x 1.5	50
3.5.9 LCD 20x4 2004 with I2C Backpack Display Arduino	50
3.5.10 LM2596 Voltmeter DC-DC Buck Converter Step Down	51
3.5.11 MAX6675 Thermocouple Temperature Sensor	51
3.5.12 Power Supply 5 Ampere 12 volt	52
3.5.13 Solid State Relay (SSR) DC-AC	52
3.5.14 Stainless Steel 316 Plate 4mm	53
3.5.15 Temperature Sensor Probe 10cm Thermocouple K-Type 100mm 2-Wire Drat M8 Kabel 5m	53
3.5.16 Terminal Block ESP 32	53
3.6 Wiring diagrams	54
3.7 Temperature control with Fuzzy Control	54
3.8 Flow Chart of Temperature Display	55
CHAPTER 4 – RESULTS AND DISCUSSIONS	56

4.1 Design Reactor.....	56
4.1.1 Sectional View of the Pyrolysis Furnace	56
4.1.2 Sectional View of the Pyrolysis Furnace	56
3.2 System Overview.....	57
3.9 Fuzzy logic control Diagram.....	58
3.3 Breakdown Structure.....	59
4.2 Testing without plastic PET.....	60
4.2.1 First testing	60
4.2.2 Second testing	61
4.2.3 Third testing	61
4.2.4 After testing	61
4.2.5 Future Justification Calculation	61
4.3 Testing with PET plastic.....	63
4.3.1 First testing with PET plastic	63
4.3.2 Second testing with PET plastic	65
4.3.3 Third testing with PET plastic	66
4.3.4 Fourth testing with PET plastic	68
4.3.5 Future Justification Calculation	69
4.4 Summary of pyrolisi reactor system.....	70
4.4.1 Heating system	70
4.4.2 Temperature sensor	70
4.4.3 Material Output and Reaction Results	71
4.4.4 Standard Deviation Testing with PET Plastic	72
CHAPTER 5 – CONCLUSIONS AND RECCOMENDATIONS.....	75
5.1 Conclusions.....	75
5.2 Recommendations.....	75
REFERENCES.....	77
APPENDIX.....	81
APPENDIX: Code for temperature control and display.....	81
APPENDIX: Bill of material.....	87
APPENDIX: Figure chapter 2.....	88
APPENDIX: Figure chapter 3.....	89
APPENDIX: Figure chapter 4.....	90
APPENDIX: List of table chapter 2.....	97
APPENDIX: List of tabel chapter 4.....	98
CURRICULUM VITAE.....	104

LIST OF FIGURES

	page
Figure 2. 1 Fuzzy Logic Control	88
Figure 2. 2 Moving Average Filter	88
Figure 3. 1 Reserch Framework Block Diagram	29
Figure 3. 2 AC Plug 16 Watt AC Plug 16 Watt	46
Figure 3. 3 Ball Valve 1/2-inch Onda	47
Figure 3. 4 Ceramic Fiber blanket	47
Figure 3. 5 Ceramic Heater 1000W 230V 750°C	48
Figure 3. 6 Earth Leakage Circuit Breaker (ELCB) 230V 32A / EFET ELCB 2 Pole	48
Figure 3. 7 ESP32 USB-C Development Board Dual Core ESP-32S Board WROOM	49
32	49
Figure 3. 8 Heat Sink for SSR	49
Figure 3. 9 Kabel NYM Tunggal 2 x 1.5	50
Figure 3. 10 LCD 20x4 2004 with I2C Backpack Display Arduino	50
Figure 3. 11 LM2596 Voltmeter DC-DC Buck Converter Step Down	51
Figure 3. 12 MAX6675 Thermocouple Temperature Sensor	51
Figure 3. 13 Power Supply 5 Ampere 12 volt	52
Figure 3. 14 Solid State Relay (SSR) DC-AC	52
Figure 3. 15 Temperature Sensor Probe 10cm Thermocouple K-Type 100mm 2-Wire	53
Drat M8 Kabel 5m	53
Figure 3. 16 Terminal Block ESP 32	53
Figure 3. 17 Wiring diagrams	89
Figure 3. 18 Temperature control with Fuzzy Control	89
Figure 3. 19 Flow Chart of Temperature Display	90
Figure 4. 1 System Overview	57
Figure 4. 2 Fuzzy logic control Diagram	58
Figure 4. 3 Breakdown Structure	59

Figure 4. 4 Growth Temperature First testing with PET plastic	63
Figure 4. 5 Growth Temperature Second testing with PET plastic	65
Figure 4. 6 Growth Temperature Third testing with PET plastic	66
Figure 4. 7 Growth Temperature Fourth testing with PET plastic	68
Figure 4. 8 4.4.4 Standard Deviation First Testing With PET Plastic	72
Figure 4. 9 Standard Deviation Second Testing With PET Plastic	72
Figure 4. 10 Standard Deviation Third Testing With PET Plastic	73
Figure 4. 11 Standard Deviation Fourth Testing With PET Plastic	73
Figure 4. 12 Sectional View of the Pyrolysis Furnace	90
Figure 4. 13 Temperature On top Placment	91
Figure 4. 14 Temperature Placment on bottom	91
Figure 4. 15 water leak forom nitrogen pipe	91
Figure 4. 16 Char after heating process	92
Figure 4. 17 Inside reactor after first testing	92
Figure 4. 18 char	92
Figure 4. 19 fail pyrolysis Process	93
Figure 4. 20 Reactor after second testing	93
Figure 4. 21 Char second testing	94
Figure 4. 22 PET weight before third testing	94
Figure 4. 23 plastic pet chopper	95
Figure 4. 24 Char after third testing	95
Figure 4. 25 carbon produce after third testing	96
Figure 4. 26 reactors after third testing	96
Figure 4. 27 water leak that swipe with fabric	96
Figure 4. 28 Reactor outside after third testing	97

LIST OF TABLES

	Page
Tabel 2. 1 Wiring diagram	98
Tabel 4. 1 Material Output and Reaction Results	71
Tabel 4. 2 First testing without PET plastic	99
Tabel 4. 3 Second testing without Plastic PET	100
Tabel 4. 4 Third Testing without PET Plastic	102

