



THESIS/ DISSERTATION PREPARATION MANUAL

Faculty of Engineering, King Mongkut's University of Technology Thonburi



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EFFECT OF CLAYS AND MAGNESIUM OXIDE ON PYROLYSIS OF
JATROPHAB RESIDUE

MISS CHANAPHA TANKASEM

A THESIS or A SPECIAL
RESEARCH PROJECT, etc

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF ENGINEERING (CHEMICAL ENGINEERING)
FACULTY OF ENGINEERING
KING MONGKUT'S UNIVERSITY OF TECHNOLOGY THONBURI

2014

MASTER OF ENGINEERING or
DOCTOR OF ENGINEERING, etc

Effect of Clays and Magnesium Oxide on Pyrolysis of Jatropha Residue

- If thesis is for master's degree, specify bachelor's degree.
- If thesis is for doctoral degree, specify master's degree.

Miss Chanapha Tankasem B.Eng. (Chemical Engineering)

A Thesis Submitted in Partial Fulfillment
of the Requirements for
the Degree of Master of Engineering (Chemical Engineering)
Faculty of Engineering
King Mongkut's University of Technology Thonburi
2014

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Thesis Title	Effect of Clays and Magnesium Oxide on Pyrolysis of Jatrophab Residue
Thesis Credits	12 or 6
Candidate	Miss Name Surname
Thesis Advisors	Asst. Prof. Dr. Name Surname Asst. Prof. Dr. Name Surname
Program	Master of Engineering
Field of Study	Chemical Engineering
Department	Chemical Engineering
Faculty	Engineering
Academic Year	2014

Abstract

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Keywords: Ant / Bat / Cat / Sort A-Z

หัวข้อวิทยานิพนธ์	[ชื่อวิทยานิพนธ์]	
หน่วยกิต	6 หรือ 12	
ผู้เขียน	นายชื่อ นามสกุล	
อาจารย์ที่ปรึกษา	ชื่ออาจารย์ที่ปรึกษา เช่น รศ. ดร.ชื่อ นามสกุล	ข้อคิดเห็น[U1]: ปรับเปลี่ยนไปตามจำนวน หน่วยกิตทั้งหมด
	ชื่ออาจารย์ที่ปรึกษาร่วม เช่น รศ. ดร.ชื่อ นามสกุล	
หลักสูตร	วิศวกรรมศาสตรดุษฎีบัณฑิต	ข้อคิดเห็น[U2]: นาย / นาง / นางสาว
สาขาวิชา	วิศวกรรมเคมี	
ภาควิชา	วิศวกรรมเคมี	ข้อคิดเห็น[U3]: ให้ดูวิธีการเขียนตำแหน่ง ทางวิชาการของคณาจารย์ ตามหน้าอนุมัติ
คณะ	วิศวกรรมศาสตร์	
ปีการศึกษา	ปีการศึกษาที่สอบ เช่น 2556	ข้อคิดเห็น[U4]: • ปรับเปลี่ยนตามชื่อปริญญาที่จะ ได้รับการศึกษา • “ศาสตร” ไม่ใช่ “ศาสตร์”
บทคัดย่อ		
ข้อความ		ข้อคิดเห็น[U5]: ปรับเปลี่ยนตามสาขาที่ศึกษา
ข้อความ		
คำสำคัญ : การขับเคลื่อนด้วยไฟฟ้า/ การขับเคลื่อนเหล็ก/ ผิวเปลือกกังสี		ข้อคิดเห็น[N6]: หลักสำคัญในการเขียนเนื้อหาข้อความของบทคัดย่อคือ ไม่ควร แปลจากภาษาอังกฤษตรงๆ เช่น ไม่ควรใช้ Passive Voice (ในการเขียนภาษาไทย)
	เรียง ลำดับ ก-ฮ ไม่ควรมีคำภาษาอังกฤษ ในคำสำคัญบทคัดย่อภาษาไทย	

ACKNOWLEDGEMENTS

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LIST OF SYMBOLS

SYMBOL		UNIT
A_{bi}	surface of heat exchanger without considering the surface area of fin	m
A_{bo}	base surface of heat exchanger	m ²
A_f	fin surface area	m ²
A_p	corrected fin profile area	m ²
C_c	heat capacity rate of cold fluid	W.K ⁻¹
C_h	heat capacity rate of hot fluid	W.K ⁻¹
C_{pc1}	constant pressure specific heat of dry air	J.kg ⁻¹ .K ⁻¹
C_{pc2}	constant pressure specific heat of saturated water vapor	J.kg ⁻¹ .K ⁻¹
h_{ca}	heat transfer coefficient of cold heat exchange	W.m ⁻² .K ⁻¹
h_{ha}	heat transfer coefficient of hot heat exchange	W.m ⁻² .K ⁻¹
I	electric current	amps
LA	length to area ratio of the TE element	m ⁻¹
L_{bc}	thickness of base cold heat exchanger	m
L_{bh}	thickness of base hot heat exchanger	m
L_c	correctd fin length	m
M	number of fins	
n	number density of the TE element	elements.m ⁻²
P	electric power applied to TE modules	W
p	pressure	N.m ⁻²
q_c	heat transfer rate at cold side	W
q_h	heat transfer rate at hot side	W

LIST OF TECHNICAL VOCABULARY AND ABBREVIATIONS

d	=	day
g	=	gram
h	=	hour
m	=	metre
cm	=	centimeter
ha	=	hectare
kg	=	kilogram
mg	=	milligram
m ²	=	square metre
cm ³	=	cubic centimeter
g/m ²	=	gram per square metre
g/m ² /d	=	gram per square metre per day
g/m ² /crop	=	gram per square metre per crop
kg/ha/d	=	kilogram per hectare per day
mg/m ² /h	=	milligram per square metre per hour
ppm	=	part per million

CHAPTER 1 INTRODUCTION (Font size 15 bold)

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1.1 Head Topic (Font size 14 bold) Head Topic

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1.1.1 Sub Topic (Font size 13 bold)

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- sub content.....

sub content if more than one line.....

1.1.2 Sub Topic (Font size 13 bold)

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1.1.3 Sub Topic (Font size 13 bold)

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1.2 Head Topic (Font size 14 bold)

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You must follow the following details in writing citations and bibliography or references.

Citations

You can use one of the two types of citation systems: number system, and name-year system.

Number system

Put a number of the cited document in brackets, such as [1], [2] at the end of cited name or content in the text. In case where several document are cited for the same content, you can separate each number by , in the same bracket: [1, 2, 3]. In this system, once you assign a number to a document, you must consistently use that number for that document throughout the thesis.

In case where you mention more than 3 authors' name, write only the last name of the first author followed by "et al.". For example:

Sugiura et al. [4] proposed that...

If in case have 2 authors' use the last name of the first author and last name of the second author For example: Samit and arter. [5]

Name-year system

Mention the name (s) of author (s) and publication year at the end of the cited content in the text. If you cite more than one document, separate them with (;). Use Christian era for the publication dates.

In case where there are more than 3 authors, write only the last name of the first author followed by a comma and "et al.". For example:

Price, et al. (1999) found that

In case where you quote from a document, mention the page number from which you quote at the end of publication year, in parentheses. For example:

Deuzen (1988, p. 29) argued that counselors must be involved with clients and "deeply interested in piecing the puzzle of life together"

If the quoting is long, putting it in a following paragraph, which has a different pagination from normal text, and the spacing is less than in normal text. For example:

Barlett (1932, p. 201) explained the cyclic process of perception thus:

“ Suppose I am making a stroke in a quick game, such as tennis or cricket. How I make the stroke depends on the relating of certain new experiences, most of them visual, to other immediately preceding visual experience, and to my posture, or balance of posture, at the moment”.

Bibliography's format

Bibliography (or references) has the following format.

Books Name

last name Author, first name and middle name (abbreviations), publication year, **name of book**, edition, publisher, publication place, page.

For example: Smiths, J.E., 1990, **Engineer**, 2nd ed., Amalin., Bangkok., pp. 120-150.

- If the name is editor's name, put the abbreviation (Ed.) after the name. If there are more than one editor, use (Eds.)

Article in a journal

Name of author, publication year, "name of article," **name of journal**, Vol., No., pp.

For example: Yeh, T.S. and Sacks, M.D., 1988, "Effect of Particle Size Distribution on the Sintering of Alumina," **Journal of the American Ceramic Society**, Vol. 71, No. 12, pp. 484-487.

Article in a proceedings

Name of author, publication year, "name of article," **name of conference**, other detail of conference such as date, place, pp.

For example: Merin, U. and Daufin, G., 1989, "Separation Process Using Inorganic Membrane in the food industry," **International Conference on Inorganic Membranes**, 6 July 1989, Paris, pp. 272-278.

Article in book

Name of author, publication year, "name of article," In **name of book**, name of editor or compiler, edition, publish, publication place, pp.

For example: Waechter, E.H., 1987, "How Families Cope : Accessing and Intervening," In **The Child and Family Facing Life-threatening Illness**, Krulik, T. (Ed.), Lippincott, Philadelphia, pp. 239-242.

Article in newspaper

Name of author, publication year, "name of article," **name of newspaper**, date, pp.

For example: Mena, N., 2014, "Ceramic Society of Japan," **Daily news.**, May 6., pp.3.

Thesis

Name of author, publication year, **name of thesis**, degree, major, faculty, university, pp.

For example: Douglas, J.S., 1975, **Hydroponics: The Bengal System with Notes on other Methods of Soilless Cultivation**, Master of Engineering Thesis, Department of Chemical Engineering, Oxford University, pp. 32-47.

Patent

Name of patent's owner, year of patent, **name of invented equipment**, country, patent number.

For example: Pinne, S., 2009, **Chemi Model**, Paris, 3421.352.110.

2.2.8 Electronic documents

Name of author, **Web Page** [Online], Available: URL [date of seach].

For example: Wuva, K.J. and Neen, t., **What is Chemical nano** [Online], Available: <http://www.nano.org.uk/nano.htm> [2009, October 5].

EXAMPLE OF TABLE

Table 1.1 Name of table

Name of table (If have over one line) [5]

Topic	Topic	Topic

EXAMPLE OF FIGURE



Figure 1.1 Name of figure [6]

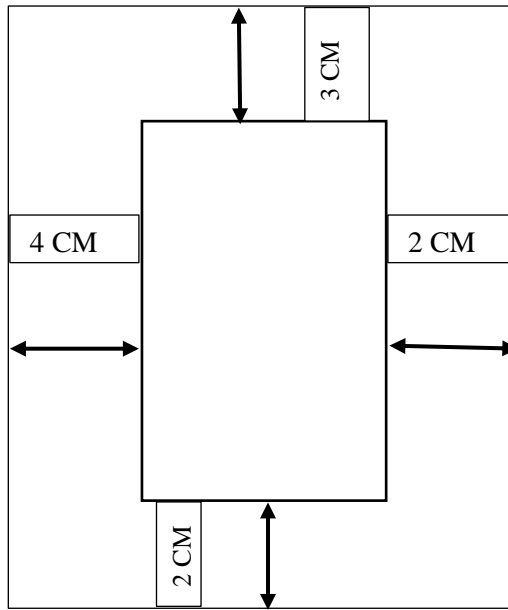


Figure 1.2 Preview Page Setup

CURRICULUM VITAE

NAME	Mr. Jatupon Tangpagasit
Date of Birth	16 January 1972
EDUCATIONAL RECORD	
HIGH SCHOOL	High School Graduation Saint Dominic School, 1990
BACHELOR'S DEGREE	Bachelor of Engineering (Civil Engineering) King Mongkut's University of Technology Thonburi, 1994
MASTER'S DEGREE	Master of Engineering (Civil Engineering) King Mongkut's University of Technology Thonburi, 1999
SCHOLARSHIP/ RESEARCCH GRANT	Research Grant for Graduate Student The Ministry of University Affairs, 2000
EMPLOYMENT RECORD	Civil Engineer Sittipongruammitr Co., Ltd., 1995-1996
PUBLICATION	Kiattikomol, K., Jaturapitakkul, C. and Tangpagasit, J., 2000, "Effect of Insoluble Residue on Properties of Portland Cement," Cement and Concrete Research , Vol. 30, Issue 8, pp. 1209-1214.