

**POLYHIPE LOADING WITH HYDROXYAPATITE
FOR BIOMEDICAL APPLICATIONS**

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A Thesis Submitted in Partial Fulfillment of the Requirement
for the Degree of Master of Science
The Petroleum and Petrochemical College, Chulalongkorn University
in Academic Partnership with
The University of Michigan, The University of Oklahoma,
and Case Western Reserve University
2013

I28372657

561043

Thesis Title: PolyHIPE Loading with Hydroxyapatite for Biomedical Applications
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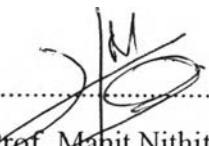
Accepted by the Petroleum and Petrochemical College, Chulalongkorn University, in partial fulfillment of the requirements for the Degree of Master of Science.



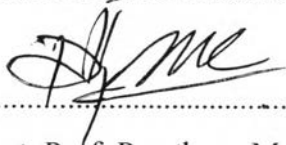
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ABSTRACT

5472029063: Polymer Science Program

Patthira Aornmuang: PolyHIPE Loading with Hydroxyapatite for Biomedical Applications.

Thesis Advisors: Asst. Prof. Manit Nithitanakul, and Asst. Prof.

Pomthong Malakul 38 pp.

Keywords: High internal phase emulsion/ Poly(S/EGDMA)polyHIPE/ PolyHIPE/ Porous scaffold/ Tissue engineering/ Hydroxyapatite

The polymerization of high internal phase emulsions (HIPEs) is a technique to create highly porous material, polyHIPE polymer. The pore size of polyHIPE porous foams can be changed from the sub-micron to micron range by varying the chemical composition of the emulsion and monomer ratio (styrene). One application for polyHIPE, which has high porosity with interconnected pores and 3D architecture is a scaffold for tissue engineering. PolyHIPE can fulfill all of the above mentioned requirements for an ideal scaffolds. In this study, polyHIPEs were modified by loading with hydroxyapatite in order to increase biocompatibility of the polyHIPE with various cells. Moreover, ethylene glycol dimethacrylate, which was used as a crosslinking comonomer, had good biocompatibility. Therefore poly(styrene/ethylene glycol dimethacrylate) polyHIPE can be considered as a viable material for tissue engineering.

บทคัดย่อ

ภัททิรา อ่อนเมือง : การดัดแปลงโพลีฮีพโดยการเติมไฮดรอกซีแอปาไทต์สำหรับการประยุกต์ใช้ทางการแพทย์ (PolyHIPE Loading with Hydroxyapatite for Biomedical Applications) อ. ที่ปรึกษา ผศ. ดร. มานิตย์ นิธิธนากุล และ ผศ. ดร. ปมทอง มาลากุล จำนวน 38 หน้า

พอลิเมอร์เรซินของอิมัลชันที่มีวิฎากภายในสูงเป็นเทคนิคในการผลิตวัสดุที่มีรูพรุนสูง เช่น โพลีฮีพ รูพรุนของโพลีฮีพสามารถมีได้ในระดับเล็กกว่าไมโครเมตรจนถึงในระดับไมโครเมตรจากการปรับเปลี่ยนองค์ประกอบทางเคมีของระบบอิมัลชัน และการปรับเปลี่ยนสไตรีนซึ่งใช้เป็นมอนอเมอร์ โพลีฮีพสามารถประยุกต์ใช้ในการทำโครงเลี้ยงเซลล์เพื่อใช้เป็นกระดูกเทียม เนื่องจากโพลีฮีพมีรูพรุนมาก รูพรุนต่อเนื่องกัน และมีโครงสร้างเป็นสามมิติ ในงานวิจัยนี้ทำการดัดแปลงโพลีฮีพโดยการเติมไฮดรอกซีแอปาไทต์ เพื่อเพิ่มความเข้ากันได้กับเนื้อเยื่อในร่างกาย นอกจากนี้เอทิลินไกลคอลไดเมทาไครเลท ซึ่งเป็นมอนอเมอร์ร่วมทำหน้าที่เชื่อมระหว่างสายพอลิเมอร์มีความเข้ากันได้กับเนื้อเยื่อในร่างกายได้อย่างดี ดังนั้น โพลีฮีพที่ทำมาจากสไตรีนและไกลคอลไดเมทาไครเลทสามารถเป็นวัสดุที่น่าสนใจในวิศวกรรมเนื้อเยื่อ

ACKNOWLEDGEMENTS

This thesis would not have been accomplished without the guidance and the support from many persons. I would like to use this opportunity to extend my heartfelt gratitude to the following.

First and foremost I would like to thank my advisor Asst. Prof. Manit Nithitanakul for the generous support and constant encouragement. Words cannot describe how grateful I am to my supervisor for his generosity, patience and understanding throughout this work. Without his valuable guidance and suggestion this thesis would not have been achievable. Life would not have been that easy without his help. He has always been kind, knowledgeable, cooperative and inspirational. Whenever I enter his office, he always asks “YES! How can I help you?”. I feel lucky and privileged working under his supervision.

I would like to express my profound gratitude and deep appreciation to Dr. Pornsri Pakeyangkoon for her valuable time and priceless advices. She sacrificed her time to teach and help me in this work. She has always given insightful comment and has been available to answer all of the questions I have.

I cannot forget to show my sincere gratitude to the financial, academic, equipment and technical support staff of the Petroleum and Petrochemical College, Chulalongkorn University and the Center of Excellence on Petrochemical and Materials Technology Thailand.

It is my pleasure to acknowledge all members of the MN group for their help and constructive suggestions and for being very good friends.

Last but not least, I would like to take this opportunity for expressing my deepest gratitude and thankfulness to my family. I cannot imagine life without the unconditional love and support from my father and my mother. Special massive thanks to my parents who brought me to this world and have been always besides me. I will always be genuinely grateful to them for working hard to provide a good education for me.

TABLE OF CONTENTS

	PAGE
Title Page	i
Abstract (in English)	iii
Abstract (in Thai)	iv
Acknowledgements	v
Table of Contents	vi
List of Tables	ix
List of Figures	x
CHAPTER	
I INTRODUCTION	1
II LITERATURE REVIEW	3
2.1 Emulsion	3
2.2 High Internal Phase Emulsion Polymerization	5
2.3 Preparation of PolyHIPE Materials	6
2.4 Objectives	14
III EXPERIMENTAL	15
3.1 Materials	15
3.2 Methodology	15
3.2.1 PolyHIPE Preparation	15
3.2.2 Hydroxyapatite Modification	16
3.2.3 Poly(S/EGDMA) PolyHIPE Foam Characterization	16

CHAPTER	PAGE
IV RESULTS AND DISCUSSION	18
4.1 Characterization of Poly(S/EGDMA) Porous Foam	18
4.1.1 Morphology of Poly(S/EGDMA) Porous Foam	18
4.1.2 Properties of Poly(S/EGDMA) Porous Foam	21
4.2 Characterization of Modified Poly(S/EGDMA) Porous Foam	23
4.2.1 Morphology of Modified Poly(S/EGDMA) Porous Foam	23
4.2.2 Properties of Modified Poly(S/EGDMA) Porous Foam	25
V CONCLUSIONS	27
REFERENCES	28
APPENDIX	31
Appendix A SEM/EDX of Poly(S/EGDMA) PolyHIPE	31
Appendix B Fourier Transform Infrared Spectroscopy Result of Poly(S/EGDMA) PolyHIPE with HA	36
CURRICULUM VITAE	38

LIST OF TABLES

TABLE		PAGE
CHAPTER II		
2.1	Surface area of PolyHIPE	9
CHAPTER IV		
3.1	Physical properties of poly(S/EGDMA) polyHIPE	21
3.2	Mechanical properties of poly(S/EGDMA) polyHIPE	22
3.3	Physical properties of modified poly(S/EGDMA) polyHIPE	25
3.4	Mechanical properties of modified poly(S/EGDMA) polyHIPE	26

LIST OF FIGURES

FIGURE		PAGE
CHAPTER II		
2.1	Emulsion breakdown.	4
2.2	Preparation of polyHIPE by HIPE technique.	7
2.3	Microstructures of foams with varying percentage of surfactant.	7
2.4	Microstructure of polyHIPEs contain varying amount of salt.	8
2.5	Microstructure of polyHIPEs varying amount of divinylbenzene.	8
2.6	Stress/strain curve of poly(styrene/divinylbenzene) polyHIPE.	10
2.7	Effect of plasma treatment time on cell attachment of polyHIPE.	11
2.8	Effect of plasma treatment time on cell proliferation of polyHIPE.	12
2.9	Depth of penetration of rat osteoblasts on polyHIPE.	13
CHAPTER IV		
4.1	Morphology of poly(S/EGDMA) polyHIPE (S:EGDMA 90:10).	18
4.2	Morphology of poly(S/EGDMA) polyHIPE (S:EGDMA 80:20).	19
4.3	Morphology of poly(S/EGDMA) polyHIPE (S:EGDMA 70:30).	19
4.4	Morphology of poly(S/EGDMA) polyHIPE (S:EGDMA 60:40).	20
4.5	Morphology of poly(S/EGDMA) polyHIPE (S:EGDMA 50:50).	20
4.6	Morphology of poly(S/EGDMA) polyHIPE with HA 0.2 % w/v.	23
4.7	Morphology of poly(S/EGDMA) polyHIPE with HA 0.4 % w/v.	23
4.8	Morphology of poly(S/EGDMA) polyHIPE with HA 0.6 % w/v.	24
4.9	Morphology of poly(S/EGDMA) polyHIPE with HA 0.8 % w/v.	24
4.10	Morphology of poly(S/EGDMA) polyHIPE with HA 1.0 % w/v.	24