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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาค้นคว้าหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

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DEVELOPMENT OF ALUMINA COATING ON A CERAMIC MONOLITH



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สถาบันวิทยบริการ

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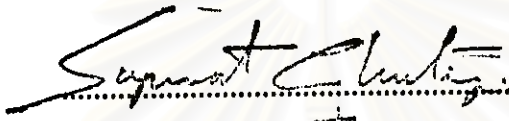
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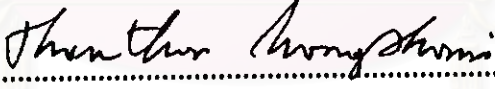
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หัวข้อ **ตั้งจุดมวงษา** : การพัฒนาการเคลือบอะลูมินาบนโมโนลิทชนิดเซรามิก

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วัตถุประสงค์ของงานวิจัยนี้ เพื่อหาสภาวะที่เหมาะสมสำหรับการปรับสภาพพื้นผิวเซรามิกโมโนลิทด้วยกรดและการเคลือบอะลูมินาบนพื้นผิวเซรามิกโมโนลิท

พบว่าสภาวะที่เหมาะสมสำหรับการปรับสภาพพื้นผิวของโมโนลิทด้วยกรดโดยแช่โมโนลิทในกรดอะซีติกเข้มข้นร้อยละ 2.5 โดยน้ำหนักเป็นเวลา 2 นาที ได้พบอีกว่าปริมาณอะลูมินาในสเลอรีเข้มข้นร้อยละ 40 โดยน้ำหนักมีความเหมาะสม อุณหภูมิและเวลาที่เหมาะสมสำหรับการเผาโมโนลิทที่เคลือบอะลูมินาแล้วคือ 500 องศาเซลเซียส เป็นเวลา 2 นาที ตามลำดับ การทดสอบการเพิ่มและลดอุณหภูมิอย่างรวดเร็วที่ 600 องศาเซลเซียส พบว่าอะลูมินาที่เคลือบบนโมโนลิทแตกเป็นเกล็ดขนาดเล็ก ส่วนการทดสอบการเพิ่มและลดอุณหภูมิอย่างรวดเร็วที่ 800 องศาเซลเซียส พบว่าอะลูมินาที่เคลือบบนโมโนลิทแตกเป็นเกล็ดขนาดใหญ่และเกล็ดอะลูมินาบางส่วนหลุดออกจากพื้นผิวโมโนลิท เมื่อทดสอบความทนทานต่อการขัดสีของอะลูมินาที่เคลือบบนโมโนลิท พบว่าน้ำหนักของโมโนลิทที่เคลือบด้วยอะลูมินาที่แตกเป็นเกล็ดขนาดเล็กลดลงน้อยกว่าโมโนลิทที่เคลือบด้วยอะลูมินาที่แตกเป็นเกล็ดขนาดใหญ่ กล่าวโดยสรุปคือ ขั้นตอนที่เหมาะสมสำหรับการเคลือบอะลูมินาบนโมโนลิทคือ เคลือบโมโนลิทในอะลูมินาสเลอรีสามครั้ง ครั้งละ 2 นาทีและเผาที่อุณหภูมิ 500 องศาเซลเซียสเป็นเวลา 2 ชั่วโมง

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

ภาควิชา วิศวกรรมเคมี
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ลายมือชื่อนิติ **ชุดชัย ตั้งจุดมวงษา**
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The objective of this study is to find the suitable condition for acid surface treatment of ceramic monolith and for coating alumina washcoat on monolith surface.

It is found that the appropriate condition for acid surface pre-treatment is dipping monolith in 2.5% by weight acetic acid for 2 min. It is also found that the suitable alumina content in washcoat slurry (alumina in 2.5 wt% acetic acid) is 40% by weight. The preferred calcination temperature and holding time in calcination for the washcoated monolith are 500°C and 2 hr., respectively. The thermalshock temperature at 600°C showed small washcoat grainsize, whereas the thermalshock temperature at 800°C showed large washcoat grainsize and some of washcoat grains released from the monolith surface. The results of the abrasive strength of the washcoated monolith showed that the monolith with small washcoat grainsize lost its coated alumina less than the monolith with larger washcoat grainsize. In conclusion, the suitable procedure for preparing the alumina washcoated monolith is dipping the monolith in alumina washcoat slurry for three times, each 2 min., and calcined at 500°C for 2 hr.

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CONTENTS

	PAGE
ABSTRACT (IN THAI).....	iv
ABSTRACT (IN ENGLISH).....	v
ACKNOWLEDGMENT.....	vi
LIST OF TABLES.....	x
LIST OF FIGURES.....	xii
CHAPTERS	
I INTRODUCTION.....	1
II HONEYCOMB SUPPORT.....	3
2.1 The catalytic reaction for pollution abatement.....	3
2.2 Substrate systems.....	5
2.2.1 Pellets.....	5
2.2.2 Monolith.....	6
2.2.2.1 Ceramic Monoliths.....	10
2.2.2.2 Metal Monoliths.....	12
III WASHCOATING TECHNIQUES.....	14
3.1 Dipping technique.....	14
3.2 The sol-gel process.....	19
IV EXPERIMENTS.....	29
4.1 Preparation of washcoat and surface characterization.....	29
4.1.1 Materials.....	29
4.1.2 Preparation of monolith sample.....	29
4.1.3 Surface treatment.....	30
4.1.4 Characterization of surface-pretreated monolith by Scanning Electron Microscopic.....	30
4.2 Comparison of amount of γ -Al ₂ O ₃ deposited on monolith in the variety of coating conditions.....	30
4.2.1 Preparation of slurry for washcoat.....	30
4.2.2 Monolith coating procedure.....	30

	PAGE
4.3 Physical properties testing of coated monolith.....	31
4.3.1 Thermalshock resistant.....	31
4.3.2 Abrasive strength.....	31
V RESULTS AND DISCUSSION.....	32
5.1 Comparison of the effect between acetic acid and nitric acid in surface pretreatment step.....	32
5.1.1 Effect of surface pretreatment in acetic acid and nitric acid solution on monolithic surface with time.....	32
5.1.2 Effect of surface pretreatment time on monolithic surface.....	43
5.1.3 Effect of surface pretreatment time on weight loss of monoliths.....	53
5.2 Effect of various conditions on washcoat preparing.....	55
5.2.1 Effect of alumina content in washcoat slurry on surface coating.....	55
5.2.2 Effect of times of dipping on surface coating.....	56
5.3 Thermalshock resistant of washcoated monolith.....	57
5.3.1 Effect of times of coating washcoat on monolith...57	
5.3.2 Effect of holding time in calcination on washcoated monolith.....	60
5.3.2.1 Comparison the effect of holding time in calcination between 2 and 4 hr. for one times of coating.....	60
5.3.2.2 Comparison the effect of holding time in calcination between 2 and 4 hr. for two times of coating.....	65
5.3.2.3 Comparison the effect of holding time in calcination between 2 and 4 hr. for three times of coating.....	70

5.3.3 Effect of calcination temperature on washcoated monolith.	75
5.3.3.1 Comparison the effect of calcination temperature between 500 and 600°C for one times of washcoat coating.....	75
5.3.3.2 Comparison the effect of calcination temperature between 500 and 600°C for two times of washcoat coating.....	80
5.3.3.3 Comparison the effect of calcination temperature between 500 and 600°C for three times of washcoat coating.....	85
5.3.4 Effect of thermalshock temperature on washcoated monolith.....	90
5.3.4.1 Comparison the effect of thermalshock temperature between 600 and 800°C for one times of washcoat coating.....	90
5.3.4.2 Comparison the effect of thermalshock temperature between 600 and 800°C for two times of washcoat coating.....	95
5.3.4.3 Comparison the effect of thermalshock temperature between 600 and 800°C for three times of washcoat coating.....	100
5.4 Abrasive strength of washcoated monolith.....	105
VI CONCLUSIONS AND RECOMMENDATIONS.....	107
REFERENCES.....	108
APPENDIX.....	109
A : Operating condition and results of Hg intrusion.....	109
B : Chemical and physical properties of alumina.....	140
VITA.....	141

LIST OF TABLES

TABLE		PAGE
2.1	Physical properties of ceramic monolith.....	12
5.1	Weight of washcoat deposited on monolith in various alumina contents.....	55
5.2	Weight of washcoat deposited on monolith in various times of coating.....	56



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

LIST OF FIGURES

FIGURE	PAGE
2.1	Location of a catalyst in underbody of an automobile..... 4
2.2	Substrate systems..... 5
2.3	Some examples of monolithic support cross section..... 8
2.4	Ceramic monolith coated with a catalyzed washcoat..... 9
3.1	A schematic cross sectional view of one embodiment of a simplified system..... 16
3.2	Schematic diagram of inorganic membranes preparation by sol-gel processing.....20
3.3	An optical micrograph of a washcoat/catalyst on honeycomb substrate where the washcoat is provided according to the first embodiment present in patent number WO 93/03840.....27
3.4	An optical micrograph of a commercially available washcoat/catalyst on a similar honeycomb substrate..... 27
4.1	Flow diagram of the abrasive strength testing..... 31
5.1	Surface of monolith..... 35
5.2(a)	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 2 min.... 36
5.2(b)	Surface of monolith pretreated in 2.5 wt% nitric acid for 2 min.... 36
5.3(a)	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 5 min.... 37
5.3(b)	Surface of monolith pretreated in 2.5 wt% nitric acid for 5 min..... 37
5.4(a)	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 10 min.. 38
5.4(b)	Surface of monolith pretreated in 2.5 wt% nitric acid for 10 min.... 38
5.5(a)	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 30 min.. 39
5.5(b)	Surface of monolith pretreated in 2.5 wt% nitric acid for 30 min.... 39
5.6(a)	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 1 hour... 40
5.6(b)	Surface of monolith pretreated in 2.5 wt% nitric acid for 1 hour..... 40
5.7(a)	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 2 hour... 41
5.7(b)	Surface of monolith pretreated in 2.5 wt% nitric acid for 2 hour..... 41

5.8(a)	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 9 hour...	42
5.8(b)	Surface of monolith pretreated in 2.5 wt% nitric acid for 9 hour.....	42
5.9	Surface of monolith.....	45
5.10	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 2 min....	45
5.11	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 5 min...	46
5.12	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 10 min..	46
5.13	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 30 min..	47
5.14	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 1 hr.....	47
5.15	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 2 hour...	48
5.16	Surface of monolith pretreated in 2.5 wt% CH ₃ COOH for 9 hr.....	48
5.17	Surface of monolith.....	49
5.18	Surface of monolith pretreated in 2.5 wt% HNO ₃ for 2 min.....	49
5.19	Surface of monolith pretreated in 2.5 wt% HNO ₃ for 5 min.....	50
5.20	Surface of monolith pretreated in 2.5 wt% HNO ₃ for 10 min.....	50
5.21	Surface of monolith pretreated in 2.5 wt% HNO ₃ for 30 min.....	51
5.22	Surface of monolith pretreated in 2.5 wt% HNO ₃ for 1hr.....	51
5.23	Surface of monolith pretreated in 2.5 wt% HNO ₃ for 2 hr.....	52
5.24	Surface of monolith pretreated in 2.5 wt% HNO ₃ for 9 hr.....	52
5.25	Weigh loss of monolith in acid surface pretreatment.....	54
5.26	The surface of washcoat deposited on monolith for one time of washcoat dipping.....	58
5.27	The surface of washcoat deposited on monolith for two time of washcoat dipping.....	58
5.28	The surface of washcoat deposited on monolith for three time of washcoat dipping.....	58
5.29	The surface of washcoat deposited on monolith dipped for one times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 600°C	61

FIGURE	PAGE
5.30 The surface of washcoat deposited on monolith dipped for one times, calcined at 500°C for 4 hr. and tested thermalshock resistance at 600°C	62
5.31 The surface of washcoat deposited on monolith dipped for one times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 800°C	63
5.32 The surface of washcoat deposited on monolith dipped for one times, calcined at 500°C for 4 hr. and tested thermalshock resistance at 600°C	64
5.33 The surface of washcoat deposited on monolith dipped for one times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 600°C	66
5.34 The surface of washcoat deposited on monolith dipped for two times, calcined at 200°C for 4 hr. and tested thermalshock resistance at 800°C	67
5.35 The surface of washcoat deposited on monolith dipped for two times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 800°C	68
5.36 The surface of washcoat deposited on monolith dipped for two times, calcined at 500°C for 4 hr. and tested thermalshock resistance at 800°C	69
5.37 The surface of washcoat deposited on monolith dipped for three times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 600°C	71
5.38 The surface of washcoat deposited on monolith dipped for three times, calcined at 500°C for 4 hr. and tested thermalshock resistance at 600°C	72

FIGURE

PAGE

5.39	The surface of washcoat deposited on monolith dipped for three times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 800°C	73
5.40	The surface of washcoat deposited on monolith dipped for three times, calcined at 500°C for 4 hr. and tested thermalshock resistance at 600°C	74
5.41	The surface of washcoat deposited on monolith dipped for one times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 600°C	76
5.42	The surface of washcoat deposited on monolith dipped for one times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 600°C	77
5.43	The surface of washcoat deposited on monolith dipped for one times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 800°C	78
5.44	The surface of washcoat deposited on monolith dipped for one times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 800°C	79
5.45	The surface of washcoat deposited on monolith dipped for two times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 600°C	81
5.46	The surface of washcoat deposited on monolith dipped for two times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 600°C	82
5.47	The surface of washcoat deposited on monolith dipped for two times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 800°C	83

FIGURE

PAGE

5.48 The surface of washcoat deposited on monolith dipped for two times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 800°C 84

5.49 The surface of washcoat deposited on monolith dipped for three times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 600°C 86

5.50 The surface of washcoat deposited on monolith dipped for three times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 600°C 87

5.51 The surface of washcoat deposited on monolith dipped for three times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 800°C 88

5.52 The surface of washcoat deposited on monolith dipped for three times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 800°C 89

5.53 The surface of washcoat deposited on monolith dipped for one times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 600°C 91

5.54 The surface of washcoat deposited on monolith dipped for one times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 800°C 92

5.55 The surface of washcoat deposited on monolith dipped for one times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 600°C 93

5.56 The surface of washcoat deposited on monolith dipped for one times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 800°C 94

FIGURE

PAGE

5.57	The surface of washcoat deposited on monolith dipped for two times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 600°C	96
5.58	The surface of washcoat deposited on monolith dipped for two times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 800°C	97
5.59	The surface of washcoat deposited on monolith dipped for two times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 600°C	98
5.60	The surface of washcoat deposited on monolith dipped for two times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 800°C	99
5.61	The surface of washcoat deposited on monolith dipped for three times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 600°C	101
5.62	The surface of washcoat deposited on monolith dipped for three times, calcined at 500°C for 2 hr. and tested thermalshock resistance at 800°C	102
5.63	The surface of washcoat deposited on monolith dipped for three times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 600°C	103
5.64	The surface of washcoat deposited on monolith dipped for three times, calcined at 600°C for 2 hr. and tested thermalshock resistance at 800°C	104
5.65	Weight loss of washcoated monolith in abrasive strength testing....	106