

CHAPTER 1 INTRODUCTION

1.1 Introduction

In the old days ceramics tableware was considered products for only upper class people, who focused only on aesthetic point of view. Hence, there were no varieties in production. At present, modern production technologies make it possible for the ceramic tableware to be in various forms to meet both artistic and technical requirements of consumers. On the leaping development of ceramic tableware in Thailand, in 2004 B.E., there were more than 60 ceramic tableware manufacturers of totally 126,000 tons per year. The amount made Thailand, among ASEAN countries, second to Indonesia in production volume. Only 8 out of 60 manufacturers, which are large manufacturers, owned advance production technologies. The rest were medium-scale and small-scale manufacturers scattered in Chiangmai, Lampang and Samut Sakorn provinces [16,29]. According to the report by Royal Porcelain Company, trends in ceramic tableware are functional ceramics, such as “Maxadura”, and those from low firing temperature technology or environment-friendly processing. It was found that there was a better direction on the development of products with better properties both in application aspect such as “Maxadura” which is a product in the group of Fine China of which the company has newly developed. The product had the property similar to Porcelain but glazy and more beautiful and also durable from breaking and without water absorption and also on production aspect such as “Ultra Strong” which is a product in the group of Fine China which is ceramics similar in property to Bone China but less translucent due to the different proportion of the raw material mixture, and its price is lower than Bone china [21]. Nevertheless, it is a pity that this technology is only used in the the large-scaled industry because it is not yet transferred to SMEs.

On the other hand, for the information on the cooking appliance it was found that there was still a need of using those food containers together with the cooking equipment (National Retail Hardware Association 2004) [17]. It was seen that at present the ovenware products had a high market share and we found that we would be able to develop the tableware ceramics for the cooking or warming appliances which corresponded to the behaviors of foreigners in using microwave oven for warming food and electric stove /oven for cooking food. Now most of the qualified ovenware ceramic products in the market is the imported products and have high cost. Provided that we can develop it to be appropriate to the production process of Thailand SMEs, the tableware industry will be thoroughly developed, and that will create the competitive chance for SMEs.

1.2 The problem

From the situation the highly competitive problem of ceramic tableware industry together with the different sizes of the industry from large- scaled industry to small-scaled industry the issues on the problems that are found can be divided into 2 main groups as follows:

The large-scaled industry

There is a lack of understanding on personnel development and creation of some motivation for the efficient performance. They prefer hiring unskilled workers to reduce the labor cost. Moreover, competition occurs in the market, especially for export.

Small and Medium-scaled industry

Most producers do not own the product designs which are their own identity because they are only hired producers resulting in lacking of capacity of having the brands which are able to be accepted worldwide. This causes the disability to set price and add value to the identity. The other problem is that they have tried to cut cost by mixing their own clay material with low-cost mineral soil which might have unstable quality. The reason is that most of them lack knowledge, technology and budget in preparing qualified clay composition. This research focus on SMEs.

1.3 The opportunity

To develop products to meet qualifications of variety, identity and high value is an important approach to overcome the competition of the lower market which has become more violent and intensive every day. “The production of raw material of ready-made clay that has unique property appropriate for using with electric and gas appliances for cooking.” It was found that we can develop appropriate material for the cooking usage which corresponds to the cooking behaviors of the foreigners that are using the microwave in warming food and electrical stove/ oven in cooking food. At present the products in the group of ovenware have a good share of marketing. There are four types of materials: metal, plastic, glass and ceramic. We will find that food containers made of glass and ceramic can be used in cooking and warming food with electric appliances in daily life. In addition to fundamental information we can find the chance to develop ceramic clay content applicable to the cooking of food, warming food and holding food for eating that has the property of thermal change resistance. The detail were shown in Chapter 2 P. 14,15

1.4 Objectives of research

1. To develop the thermal shock resistance clay for tableware ceramic industry in Thailand.
2. To add alternatives for tableware ceramic (ovenware) production for SMEs.

1.5 Project planning

1.5.1 Project Scheduling

This project was planned to cover a period of 108 months. It will start with industry study (Front end study) in second semester of academic year 2006, literature review, preliminary specification of ovenware ceramic body, experimental procedure, prototype testing, prototype development and commercialization plan and documentation.

Table 1.1 Project Scheduling

Procedure	Method	Period
1. Industry study (Front end study)	Study in tableware ceramics industries; analyzed problem, gap, competitive situation, target market, opportunity and data screen for development.	6 months
2. Literature review	Study related field in publication paper, text, documentation and investigated revealed technology, trend and environment effect.	6 months

Table 1.2 Project Scheduling (Ext.)

Procedure	Method	Period
3. Preliminary specification of ovenware ceramics body.	- Product in the market checking. - Summarized the problem, gap, opportunity, technology - Competitiveness and evaluated the data to set up preliminary specification of ovenware ceramics body.	6 months
4. Experimental procedure.	Material selection, sample preparation, standard selection and manufacturing.	10 months
5. Prototype Testing of expander materials, negative active materials and traction battery.	Prototype phase 1: - Raw material characterizations by XRD and XRF. - Design of experimental compositions by using MgO - Al ₂ O ₃ - SiO ₂ phase diagram. - Sample preparations and characterized by COE XRD.	20 months
6. Prototype development.	Prototype phase 2: Varying ball milling times Prototype phase 3: Flux adding. Prototype phase 4: The composition of the Waste from Industry.	36months
7. Commercialization plan	Commercialization plan writing.	6 months
8. Documentation	Report writing.	6 months

1.5.2 Project Milestones

Table 1.3 Project Milestones (Year 1-3)

Procedure	Year 1						Year 2						Year 3					
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
1. Industry study (Front end study)																		
2. Literature review.																		
3. Preliminary specification of ovenware ceramics body																		
4. Experimental procedure																		
5. Prototype Testing of expander materials, negative active materials and traction battery																		

Table 1.3 Project Milestones (Year 4-6)

Procedure	Year 4						Year 5						Year 6					
	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72
5. Prototype Testing of expander materials, negative active materials and traction battery.																		
6. Prototype development.																		

Table 1.4 Project Milestones (Year 7-9)

Procedure	Year 7.						Year 8.						Year 9.					
	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108
6. Prototype development.																		
7. Commercialization plan																		
8. Documentation																		

The project milestones are 8 points as shown in Table 1.2 -1.4

End of month 6: Would be received opportunity.

End of month 12: Would be received knowledge of ovenware ceramics.

End of month 18: Would be received preliminary specification of ovenware ceramics.

End of month 28: Would be received Material selection, sample preparation, Standard Test selection and manufacturing.

End of month 48: Would be received prototype phase.

End of month 84: Would be received prototype development phase 2-4.

End of month 90: Would be received write up commercialization plan.

End of month 96: Would be received write up report.

1.6 Expected benefits

1. Got the new thermal shock resistance clay for tableware ceramics industry in Thailand.
2. Thailand SMEs have more alternatives in the production of tableware ceramics (ovenware)