## EFFECT OF ZIRCONIA ADDITION ON LEUCITE CRYSTALLIZATION IN DENTAL PORCELAIN NANOCOMPOSITES

NOLAPAN VUDHIVANICH

MASTER OF SCIENCE
IN DENTISTRY

THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
AUGUST 2013

## EFFECT OF ZIRCONIA ADDITION ON LEUCITE CRYSTALLIZATION IN DENTAL PORCELAIN NANOCOMPOSITES

NOLAPAN VUDHIVANICH

A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF SCIENCE
IN DENTISTRY

THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
AUGUST 2013

## EFFECT OF ZIRCONIA ADDITION ON LEUCITE CRYSTALLIZATION IN DENTAL PORCELAIN NANOCOMPOSITES

NOLAPAN VUDHIVANICH

THIS THESIS HAS BEEN APPROVED

TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF MASTER OF SCIENCE

IN DENTISTRY

**EXAMINING COMMITTEE** 

THESIS ADVISOR

R Wongmaneering CHAIRPERSON

RPERSON Atlant

Dr. Rewadee Wongmaneerung

Asst. Prof. Dr. Attavit Pisitanusorn

Assoc. Prof. Dr. Supon Ananta

111

Attant tisitan MEMBER

Asst. Prof. Dr. Attavit Pisitanusorn

8 August 2013 Copyright by Chiang Mai University

## **ACKNOWLEDGEMENTS**

I would like to express my sincere thanks for my advisor, Asst. Prof. Dr. Attavit Pisitanusorn, for his initial encouragement in directing me towards this research project, a proof of this thesis and valuable advice throughout the study.

I would like to thank my chairperson committee Dr. Rewadee Wongmaneerung, Faculty of Science, MaeJo University for their helpful advices, kindly comments and valuable suggestions and information about in and out of thesis.

I also would like to thanks Assoc. Prof. Dr. Supon Anata, Faculty of Science, Chiang Mai University for his helpful advices friendly comments and valuable suggestions and information about thesis.

I would like to thank all helps and supports from Department of Physics and Material Sciences, Faculty of Science, Chiang Mai University for their helps about XRD and SEM-EDX results, especially, Ms. Phakkhananan Pakawanit and Ms. Penphitcha Amonpattaratkit who have supported me.

I must acknowledge the Faculty of Dentistry, Faculty of Science, Graduate School, Chiang Mai University; especially, and Thailand Research Fund (TRF) for all Financial Supports.

My special thanks are also extended to all staffs of the Department of Prosthodontics, Faculty of Dentistry, Chiang Mai University for their suggestion. I would like to express my appreciation to my friends who have supported me.

With love and respect on my mind, I would like to dedicate my thesis to my parents, Mr. Prakong Vudhivanich and Mrs. Uraiwan Vudhivanich who always teach me that perseverance is necessary to overcome obstacles in life.

I tried to thank everybody who helped me to achieve this goal. Therefore, if some people are missing on this list, I apologize to them at this point and of course thank them very much for their help and presence.