

THE EFFECT OF A NOVEL PHOTOINITIATOR SYSTEM (RAP) ON DENTAL
RESIN COMPOSITES' FLEXURAL STRENGTH, POLYMERIZATION
STRESS, AND DEGREE OF CONVERSION

by

Kellie Schaub

Submitted to the Graduate Faculty of the School of Dentistry in partial fulfillment of the requirements for the degree of Master of Science in Dentistry, Indiana University School of Dentistry, 2009.

Thesis accepted by the faculty of the Department of Prosthodontics, Indiana University School of Dentistry, in partial fulfillment of the requirements for the degree of Master of Science in Dentistry.

Carl J. Andres

Suteera Hovijitra

David Brown

Jeffrey A. Platt
Chair of the Research Committee

John A. Levon
Program Director

Date:_____

ACKNOWLEDGMENTS

I want to sincerely thank my mentors throughout the years for their guidance and sincere thoughtfulness. Dr. Carl Andres, Dr. John Levon, Dr. Suteera Hovijitra, and Dr. David Brown, thank you so much for all your support and dedication to the educational process. I would not be where I am today without you all. I especially want to thank Dr. Jeffrey A. Platt for his direction and motivation to make this research possible. Finally, I want to thank my family, especially my husband, Paul, for allowing me to follow my dreams.

TABLE OF CONTENTS

Introduction.....	1
Review of Literature.....	4
Methods and Materials.....	17
Results.....	24
Figures and Tables.....	27
Discussion.....	48
Summary and Conclusions.....	53
References.....	56
Abstract.....	60
Curriculum Vitae	

LIST OF ILLUSTRATIONS

FIGURE 1	Bis-GMA molecular structure.....	28
FIGURE 2	Camphoroquinone molecular structure.....	29
FIGURE 3	Free radical addition polymerization activation diagram.....	30
FIGURE 4	Sample of FTIR spectra uncured and cured.....	31
FIGURE 5	Stainless steel split mold.....	32
FIGURE 6	Three-point bending apparatus.....	33
FIGURE 7	Tensometer.....	34
FIGURE 8	FTIR.....	35
FIGURE 9	Peak stress graph.....	36
FIGURE 10	Flexural modulus graph.....	37
FIGURE 11	Example of tensometer curves.....	38
FIGURE 12	Maximum stress rate graph.....	39
FIGURE 13	Maximum stress graph.....	40
FIGURE 14	Degree of conversion.....	41
FIGURE 15	Degree of conversion vs. polymerization stress graph.....	42

TABLE I	Peak stress data collected from flexural strength testing.....	43
TABLE II	Flexural modulus data collected from flexural strength testing.....	44
TABLE III	Maximum stress rate data collected from tensometer testing.....	45
TABLE IV	Maximum stress data collected from tensometer testing.....	46
TABLE V	Degree of conversion data collected from FTIR testing.....	47