## SYNTHESES OF TADDOL-ANTHRACENE ADDUCTS AS CHIRAL CATALYSTS FOR USE IN ASYMMETRIC ADDITION REACTIONS

DUANGRAT NIM-ANUSSORNKUL

MASTER OF SCIENCE
IN CHEMISTRY

THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
OCTOBER 2011

## SYNTHESES OF TADDOL-ANTHRACENE ADDUCTS AS CHIRAL CATALYSTS FOR USE IN ASYMMETRIC ADDITION REACTIONS

DUANGRAT NIM-ANUSSORNKUL

A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SCIENCE

adan Sun Sin CHEMISTRY

Adan Sun Sin CHEMISTRY

Adam Sun Sin CHEMISTRY

THE GRADUATE SCHOOL

CHIANG MAI UNIVERSITY

OCTOBER 2011

## SYNTHESES OF TADDOL-ANTHRACENE ADDUCTS AS CHIRAL CATALYSTS FOR USE IN ASYMMETRIC ADDITION REACTIONS

**DUANGRAT NIM-ANUSSORNKUL** 

THIS THESIS HAS BEEN APPROVED

TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF MASTER OF SCIENCE

IN CHEMISTRY

**EXAMINING COMMITTEE** 

THESIS ADVISOR

W. Hompimon CHAIRPERSON

Assoc. Prof. Dr. Wilart Pompimon

Asst. Prof. Dr. Puttinan Meepowpan

tuttinan Meepeupan MEMBER

Asst. Prof. Dr. Puttinan Meepowpan

.. MEMBER

Asst. Prof. Dr. Apiwat Baramee

19 October 2011 © Copyright by Chiang Mai University

## **ACKNOWLEDGEMENTS**

This thesis would not have been possible unless the assistance of many people whose I would like to acknowledge.

I would like to express my deep and sincere gratitude to my supervisor, Asst. Prof. Dr. Puttinan Meepowpan. He has taught me the excellent technical, his kind encouragement, useful advice and excellent guidance.

I owe my deepest gratitude to Assoc. Prof. Dr. Wilart Pompimon and Asst. Prof. Dr. Apiwat Baramee for their helpful comments, guidance and discussions.

I am indebted to my colleagues in CB1222 to support me for their encouragement and technical supporting. I would like to thanks Mr. Rathawat Dangngern and Mr. Chanchai Sattayanont for their help and knowledge in the computational chemistry programs, Miss Duangdao Channei and Miss Pathinan Paengnakorn for downloading a lot of publications and also thanks to all my friends whose names are not listed here that contributed to the success of this work.

I would like to acknowledge the Human Resource Development in Science Project (Science Achievement Scholarship of Thailand, SAST), the National Research University Project under Thailand's office of the Higher Education Commission for financial support, Department of Chemistry, Faculty of Science, Chiang Mai University for facilities support. The Graduate School of Chiang Mai University is also acknowledged.

To my mom and family, thank you so much for encouraging, supporting and loving for me especially my mom and sister who are the best consultants when I had problems. To my mom, I am glad to be your daughter.

Duangrat Nim-anussornkul

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ Copyright<sup>©</sup> by Chiang Mai University All rights reserved