PETROCHEMISTRY OF MAFIC IGNEOUS ROCKS IN MAE SAI AND MAE CHAN DISTRICTS, CHIANG RAI PROVINCE

KANJANA KANHAYUWA

MASTER OF SCIENCE IN GEOLOGY

THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
AUGUST 2013

PETROCHEMISTRY OF MAFIC IGNEOUS ROCKS IN MAE SAI AND MAE CHAN DISTRICTS, CHIANG RAI PROVINCE

KANJANA KANHAYUWA

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

THE GRADUATE SCHOOL CHIANG MAI UNIVERSITY AUGUST 2013

PETROCHEMISTRY OF MAFIC IGNEOUS ROCKS IN MAE SAI AND MAE CHAN DISTRICTS, CHIANG RAI PROVINCE

KANJANA KANHAYUWA

THIS THESIS HAS BEEN APPROVED TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN GEOLOGY

EXAMINING COMMITTEE	THESIS ADVISOR
My CHAIRPERSON	~ 5 -
Assoc. Prof. Dr. Punya Charusiri	Asst. Prof. Dr. Burapha Phajuy
Phisit Cintrahu. MEMBER	
Asst. Prof. Dr. Phisit Limtrakun	
MEMBER	
Asst. Prof. Dr. Burapha Phajuv	

ACKNOWLEDGEMENT

The author would like to express my sincere gratitude to my supervisor, Asst. Prof. Dr. Burapha Phajuy for his stimulating supervision, support and encouragement, and correcting the manuscript. Thank is also express to Dr. Boontarika Srithai for advice and guidance and special thank to Mrs. Patcharin Kosuwan Jundee for her assistance in laboratory work to analyze REEs.

The members of Igneous Rocks and Related Ore Deposits Research (IRO), Department of Geological Sciences, Chiang Mai University, both staffs and students are thankful for suggesting my knowledge and experience in this field and thesis writing. A special thank is for Dr. Xia Xiaoping (Guangzhou Institute of Geochemistry, China) for helping out with REEs analyses.

Thanks are also extended to staffs and friends at the Department of Geological Sciences, Chiang Mai University, who assisted me during this study, in particular,

- Mrs. Mayuree Promphutha for her opportunity to use instructions of field work and chemical analyses;
- Mr. Thanapat Kunyodying for his opportunity to use geological and topographical maps;
- Mr. Jaturapan Boonsa, Ms. Podjaman Jareunpon, Ms. Naparat Kasetsomboon and Ms. Jantanee Duangkamsawad for their helps in field work and collecting samples;
- Mr. Chantip Pantusa and Mr. Chanawut Suksabay for helps in preparing thin section and powder samples;
- Mr. Siwakorn Chimnakphant and Mr. Chanawut Suksabay for their helps in petrographic studies
- Mr. Chanawut Suksabay, Mr. Supalerg Garagait, Mr. Jaturapan Boonsa and Mr. Pakpoom Reunjan for their helps the preparation in Laboratory;
- Mr. Piyanut Wiriyasuksing and Ms. Lakkhana Kanhayuwa for their helps in guidance about writing paper and writing thesis;

- Asst. Prof. Dr. Apichet Boonsoong and Mr. Satit Kantata for the analyses of major- and minor- oxides, and trace elements by XRF;
- All the graduate and undergraduate students at the Department of Geological Sciences, Chiang Mai University from years 2010-2013, for their valuable advice, guidance and their hospitality, companionship, support and encouragement.
- All the members of Department of Geological Sciences, Chiang Mai University, who have not earlier mentioned, for their hospitality, companionship, support and encouragement.

All my success is supported by my parents including my mother, my father and my older sister. They have all the good things, encouragement and several supports for me and always wait to see this achievement.

Kanjana Kanhayuwa