



THESIS APPROVAL
GRADUATE SCHOOL, KASETSART UNIVERSITY

Doctor of Philosophy (Chemistry)

DEGREE

Physical Chemistry

FIELD

Chemistry

DEPARTMENT

TITLE: Vapor Phase Beckmann Rearrangement on Industrial Nanocatalysts:
 Structure and Reaction Mechanisms

NAME: Mr. Jakkapan Sirijaraensre

THIS THESIS HAS BEEN ACCEPTED BY

THESIS ADVISOR

(Professor Jumras Limtrakul, Ph.D.)

COMMITTEE MEMBER

(Miss Pensri Bunsawansong, Ph.D.)

COMMITTEE MEMBER

(Assistant Professor Piboon Pantu, Ph.D.)

DEPARTMENT HEAD

(Assistant Professor Noojaree Prasitpan, Ph.D.)

APPROVED BY THE GRADUATE SCHOOL ON _____

DEAN

(Associate Professor Vinai Artkongharn, M.A.)