

**DEVELOPMENT OF CARRIER TRANSPORT
LAYERS FOR EFFICIENCY ENHANCEMENT
OF ZnO DYE-SENSITIZED SOLAR CELLS**

SUTTHIPOJ SUTTHANA

**DOCTOR OF PHILOSOPHY
IN APPLIED PHYSICS**

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**GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
JUNE 2016**

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FOR EFFICIENCY ENHANCEMENT OF ZnO
DYE-SENSITIZED SOLAR CELLS**



**A THESIS SUBMITTED TO CHIANG MAI UNIVERSITY IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
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THIS THESIS HAS BEEN APPROVED TO BE A PARTIAL FULFILLMENT
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30 June 2016

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With love to family.

With respect to advisors and teachers.

This thesis is dedicated for peace.



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ACKNOWLEDGEMENT

I would like to kindly thank my supervisor, Assistant Professor Dr. Supab Choopun, for valuable suggestions, distributions, and patience during my PhD studies. I am also grateful for his enthusiasm, in particular for motivating me to improve my research skills. Special thanks also go to my co-supervisors, Assistant Professor Dr. Duangmanee Wongratanaphisan and Dr. Surachet Phadungdhithhada, for support, enthusiasm, and patience during my PhD studies.

I am very grateful to the Energy Policy and Planning Office, Ministry of Energy and Kasetsart University for financial support.

I am grateful to members of Applied Physics Research Laboratory (APRL) for continuing friendship and advice. Most of all, I would like to thank my family for always believing in me and encouraging me to achieve my goals. I am truly thankful.

Sutthipoj Sutthana

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