

**SYNTHESIS AND CHARACTERIZATION OF
COPPER OXIDE NANOSTRUCTURES BY
MICROWAVE-ASSISTED THERMAL
OXIDATION FOR DYE-SENSITIZED
SOLAR CELL APPLICATIONS**



KARAKADE KAEWYAI

DOCTOR OF PHILOSOPHY

IN APPLIED PHYSICS

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**GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
NOVEMBER 2016**

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KARAKADE KAEWYAI

**A THESIS SUBMITTED TO CHIANG MAI UNIVERSITY IN PARTIAL
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THIS THESIS HAS BEEN APPROVED TO BE A PARTIAL FULFILLMENT OF
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IN APPLIED PHYSICS

Examination Committee:

P. K......Chairman

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D. Wongratanaphisan.....Advisor

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With love to mum and dad



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Karakade Kaewyai