

CELLULOSE NANOCRYSTALS AS A
DISPERSANT IN THERMAL TRANSPORT
FLUID: INVESTIGATION OF HEAT
TRANSFER ANALYSIS IN AUTOMOTIVE
COOLING SYSTEM

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We hereby declare that we have checked this thesis and in our opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Master of Science.

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I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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TRANSPORT FLUID: INVESTIGATION OF HEAT TRANSFER ANALYSIS IN
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LIST OF SYMBOLS

TiO ₂	Titanium Dioxide
ZnO	Zinc Oxide
SiO ₂	Silicon Dioxide
CNT	Carbon Nanotube
MWCNT	Multi Walled Carbon Nanotube
CuO	Copper Oxide
GO	Graphene Oxide

LIST OF ABBREVIATIONS

CNC	Cellulose Nanocrystals
EGW	Ethylene glycol-distilled water mixture
TEM	Transition Electron Microscope
SEM	Scanning Electron Microscope
UV-Vis	Ultra Violet visible Spectrometry
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
DSC	Differential Scanning Calorimetry
STA	Simultaneous Thermal Analyzer
IEP	Isoelectric Point
LPM	Liter per Minute
RPM	Rotation per Minute
RSM	Response Surface Methodology