

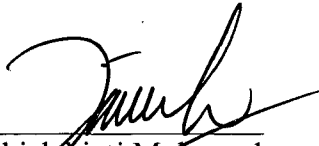
**SYNTHESIZES AND ELECTRICAL TRANSPORT PROPERTIES  
OF  $(\text{La}_{0.7-x}\text{Nd}_x)\text{Ca}_{0.3}\text{MnO}_3$  WITH SUBSTITUTIONS OF  
( $x=0.00, 0.05, 0.10, 0.15$  AND  $0.20$ )**

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**Final Year Project Report Submitted in  
Partial Fulfillment of the Requirement for the  
Degree of Bachelor of Science (Hons.) Industrial Physic in the Faculty  
of Applied Sciences  
Universiti Teknologi MARA**

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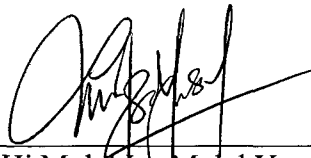
This Final Year Project Report entitled “Synthesizes and Electrical transport Properties of  $(La_{0.7-x}Nd_x)Ca_{0.3}MnO_3$  with substitutions of ( $x=0.00, 0.05, 0.10, 0.15$  and  $0.20$ )” was submitted by Tuan Zulkifli bin Tuan Mohd, in partial fulfillment of the requirement for the degree of Bachelor of Science (Hons.) Industrial Physic, in the Faculty of Applied Sciences and was approved by



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Alhamdulillah and thanks to Allah for blessing me to finish this Final Year Project.

After two semesters gathering a lot of information about CMR material and under went laboratory working about four months to collect all the necessary data in investigating of  $(La_{0.7-x}Nd_x) C_{0.3}MnO_3$  material. Now, every thing is already completed and I represent my work in form of this thesis.

First of all I would like to express my appreciation and a lot of thanks to my supervisor, Madam Zakiah binti Mohamed for all of contribution she had done to complete this project. I am also would like to thanks to all seniors who had given their hand during under went the laboratory working.

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## ABSTRACT

### Structure and electrical properties of $(\text{La}_{0.7-x}\text{Nd}_x)\text{Ca}_{0.3}\text{MnO}_3$ , with concentration of $x=0.00, 0.05, 0.10, 0.15$ and $0.20$

CMR material with nominal composition  $(\text{La}_{0.7-x}\text{Nd}_x)\text{Ca}_{0.3}\text{MnO}_3$  ( $x=0.00-0.20$ ) were synthesized and its electrical and structure properties were investigated by the conventional solid state reaction method. All the data is collected by using four point probe and XRD. The result showed metal – insulator temperature  $T_{MI}$  is shifted to lower temperature and the resistivity is increased by increasing the portion of Neodymium (Nd) substitution but interesting characteristic are displayed by  $x=0.15$  and  $0.20$  the resistivity of both sample is drop drastically and the phenomenon is expected due to the properties of Nd . On the metallic region all samples are fitted well with combination of electron-electron and electron- magnon. The decreasing in the resistivity is suggested due to weaken of double exchange mechanism (DE). Existence of Nd into the perovskite had influence the bonding angle of Mn-O-Mn.  $e_g$  electron on the  $\text{Mn}^{3+}$  can not move to  $\text{Mn}^{4+}$  easily. From the data obtained and the previous study the structure of all samples is in orthorhombic, where  $a \neq b \neq c$ .