

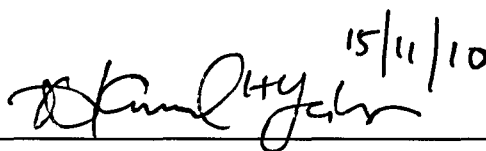
**EFFECTS OF BaZrO₃ DOPING ON DIELECTRIC PROPERTIES OF
CaCu₃Ti₄O₁₂ (CCTO) CERAMICS**

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**Final Year Project Report Submitted
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This Final Year Project Report entitled “Effects of BaZrO₃ Doping on Dielectric Properties of CaCu₃Ti₄O₁₂ (CCTO) Ceramics” was submitted by Noorilyani Binti Harun, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) in Physics In the Faculty of Applied Sciences, was approved by

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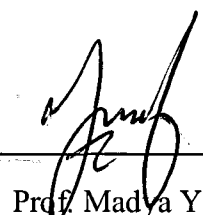
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ABSTRACT

EFFECTS OF BaZrO_3 DOPING ON DIELECTRIC PROPERTIES OF $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$ (CCTO) CERAMICS

The study of effects of BaZrO_3 doped $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$ (CCTO) will be carried out. From previous reports, it is shown that $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$ (CCTO) has been found to show that it has a very high dielectric constant at room temperature. This characteristic makes it potentially useful for important applications in microelectronics and memory devices. However, the dielectric loss of the material is becoming less useable. According to this problem, this project doped CCTO with BaZrO_3 to lower the dielectric loss. The BaZrO_3 doped CCTO was prepared by using the solid state reaction method. An X-ray diffractometer is employed to determine the phase of the compound of the samples. From the results, the doped samples exhibit two phases, which are expected CCTO phases and BaZrO_3 phases. Electrical Impedance Spectroscopy (EIS) is used to measure the electrical behaviour of each sample. The doping of BaZrO_3 on CCTO reduced their dielectric loss below 0.1 beyond 100 Hz due to an increase in grain boundary resistivity followed by the Internal Barrier Layer Capacitance (IBLC) Model. The dielectric constant of the doped samples is still high, which is the value drop from 5,910 to 2,688 at 100 Hz due to the effect of the difference in dielectric constant of the doping (BaZrO_3) and the CCTO.