

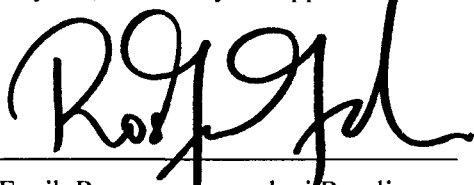
**MICROSTRUCTURE AND THE DIELECTRIC PROPERTIES OF
Eu AND Co CO-DOPED BiFeO₃**

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**Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
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in the Faculty of Applied Sciences
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This Final Year Project Report entitled “**Microstructure and Dielectric Properties of Eu and Co Co-doped BiFeO₃**” was submitted by Tuan Syarifah Nurul Hanani Bt Syed Ahmad, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Industrial Physics, in Faculty of Applied Sciences, and was approved by



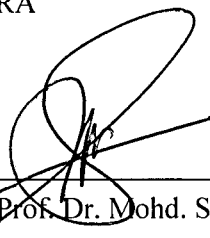
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ABSTRACT

MICROSTRUCTURE AND DIELECTRIC PROPERTIES OF Eu AND Co CO-DOPED BiFeO₃

Pure BiFeO₃, Eu³⁺ doped BiFeO₃, and Eu³⁺ and Co³⁺ co-doped BiFeO₃. The BiFeO₃, Bi_{1-x}Eu_xFeO₃ and Bi_{1-x}Eu_xFe_{1-y}Co_yO₃ were successfully prepared by solid state reaction method with ($x = 0.1, 0.15, 0.2$ and $y = 0.1, 0.15$). The effects of the doped and co-doped was studies on dielectric properties of BiFeO₃, Bi_{1-x}Eu_xFeO₃ and Bi_{1-x}Eu_xFe_{1-y}Co_yO₃ samples have been studied by performing x-ray diffraction (XRD), scanning electron microscopy (SEM) and dielectric measurement by electrical impedance spectroscopy (EIS). The results of the samples Bi_{1-x}Eu_xFeO₃ and Bi_{1-x}Eu_xFe_{1-y}Co_yO₃ are compared to the pure bismuth ferrite (BiFeO₃). XRD results confirm the formation of BiFeO₃ as major phase with secondary phase when codoped with Co. The SEM indicated that the sizes of the crystalline of the samples were decreased with increases of concentrations of the Eu and Co doped in the samples. Co-doping of the sample is smallest crystalline size and the pure sample is the most large crystalline size except for the $y = 0.1$. Dielectric measurement is done for all the samples. The low frequency dielectric constant and dielectric loss of samples decreases with increase in frequency. The sample of codoping Eu and Co in BiFeO₃ showed largest dielectric constant and smallest dielectric loss values compared to the pure BiFeO₃.