Can \( \text{BaFe}_{12}\text{O}_{19} \) Be Transmuted into a Room-Temperature Multiferroic?

1Jayda-Marie Shine, 2Yilin Evan Li, 2Darrell G. Schlom

1Engineering Physics, Spelman College
2Material Science and Engineering, Cornell University

I. Introduction

II. Method

Using flux-controlled growth, BaM was grown on \( \text{Al}_2\text{O}_3 \) substrates to calibrate optimal growth conditions. Then BaM was grown on SGMZ substrates to apply an epitaxial strain to potentially have a multiferroic material.

III. Results

\( \omega \) Scans, 2D Scans, and AFM Imaging was done on BaM film grown on Sapphire (\( \text{Al}_2\text{O}_3 \)) substrates. Adjusting iron flux according to each samples growth calibration to achieve flux stoichiometry. Having an optimal flux ratio allows for optimal crystal quality and smoothness.

IV. Conclusion

Future work includes further research on whether an epitaxial strain can be applied to BaM on SGMZ substrates.

V. Acknowledgements

Special thanks to Yilin Evan Li, Darrell G. Schlom, Jim Overhiser, Brenda Fisher for allowing me the space and freedom I needed to grow my knowledge and conduct my research. This work is supported by NSF, PARADIM, and PREM.

VI. References