

DIELECTRIC VARIATIONS OF BARIUM TITANATE ADDITIONS ON MULLITE- KAOLINITE SAMPLE

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ABSTRACT

This research was designed to form better dielectric composite material using one steady state dielectric with a good dielectric material. Distinct dielectric composites were successfully produced using locally sourced kaolinite clay. The samples were made using kaolinite as the base matrix and Barium Titanate (BT) added at varying ratios. Barium Titanate was synthesized via solid-state reaction using Barium Carbonate and rutile Titanium (IV) Oxide sintered at 1300°C. Local white kaolinite was used as the matrix at varying weight ratios. The powders were dry-mixed and made into pellets for calcination at 1000°C. The dielectric measurements were carried out using HP 4291B Impedance Analyzer dielectric setup. Three samples were prepared, namely 50%BT, 60%BT, and 70%BT. The dielectric measurements were carried out in an LT furnace at temperatures 30°C - 400°C with frequencies ranging from 10 Hz to 1 MHz. Measurements showed varying ionic relaxation for all samples.

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REFERENCES

- [1]. Rex W. Grimshaw, (1971); *The Chemistry and Physics of Clay and Allied Ceramic Material*, 4th Ed., Wiley Interscience, London.
- [2]. David Cruickshank, (2003); *1-2GHz Dielectric and Ferrites: Overview and Perspectives*, *Journal of the European Ceramic Society*, Vol. 23, 2721-2726.
- [3]. A. Kremenovic, P. Norby, R. Dimitrijevic and V. Dondur, (1997); *Solid State Ionics*, Vol. 101, 611.
- [4]. H.D.Megaw, (1947); *Proc. R. Soc. London, Ser. A*, Vol. 189, 261.
- [5]. John A. Dean, (1987); *Lange's Handbook of Chemistry*, 13th ed, McGraw-Hill Book Company, Singapore.
- [6]. K. Orzechowski, T. Slonka and Jglowinski, (2006); *Dielectric Properties of Intercalated Kaolinite*, *Journal of Physics and Chemistry of Solids*, Vol. 67, 915-919.
- [7]. Shu-Hui Xie, Bao-Ku Zhu, Xiu-Zhen, Wei Zhi-Kang Xu and You-Yi Xu, (2005); *Polyimide/BaTiO₃ Composites with Controllable Dielectric Properties*, *Composites Part A: Applied Science and Manufacturing*, Vol. 36, 1152-1157.
- [8]. C.K. Chiang, R. Popielarz, and L. P. Sung, (2001); *Dielectric Properties and morphology of Ferroelectric Ceramic-polymer Composite Films*, *Mat. Res. Soc. Proc Symposium N on "Microelectronics and Micro-system Packaging"*, Vol.

682, N6.9 1-6