

Abstract Submitted
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Effect of Grain Size on the AC Electrical Properties of Kaolinite/Polystyrene Composites LINA ABDALLAH, NMSU, AWWAD ZIHLIF — Impedance spectroscopy has been used to study the effect of kaolinite grain sizes on the AC electrical properties of kaolinite/polystyrene composites under different temperatures and applied frequencies. Impedance measurements were performed on prepared composites containing 20% kaolinite mineral of grain sizes 63, 106, 212, and 300 μm in addition to neat polystyrene. The measured electrical quantities such as impedance, phase angle, dielectric constant and loss, AC conductivity, and thermal activation all showed a temperature and frequency dependence. The dielectric constant and loss increases with both grain size and temperature. The AC conductivity increases with decreasing kaolinite grain sizes. The 63 μm grain size composite has higher electrical conduction under applied frequencies and temperatures. A statistical model is presented to explain the dependence of the AC electrical properties on the filler grain size. The study concludes that the overall electrical behavior is influenced by some processes such as electron hopping, ion diffusion, and space charge polarization that take place in the composite microstructure.

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