# Investigation of Electrical Properties of Microcrystalline Cellulose Based Composite Materials

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Polypropylene - micro crystalline cellulose-based composites have shown great potential in various applications as a modern composite material. Microcrystalline cellulose has gained great interest in composite fabrication as a reinforcing material, with the advantages of higher physical and mechanical properties, which comes with its peculiar micrometric dimensions. In this study, microcrystalline cellulose was incorporated into polypropylene based composites to improve the electrical properties of Polypropylene based polymer composites.

Hydrophilic Microcrystalline cellulose creates a weak interface with hydrophobic polypropylene resulting poor compatibility in two materials. Therefore, sunflower oil ethyl esters were used as the surface modifier to improve the compatibility with hydrophobic polypropylene. Sunflower oil ethyl esters were trans esterified onto microcrystalline cellulose surface using ultrasonication technology to enhance the surface hydrophobicity of microcrystalline cellulose. Modified microcrystalline cellulose was characterized by FTIR, SEM and wettability analysis. The electrical properties such as dielectric loss, dielectric constant and AC electrical conductivity of the developed composites were experimentally determined in this study. Experimental results indicated that the variation of dielectric constant and dielectric loss characteristics values of Polypropylene-microcrystalline cellulose composites at different microcrystalline cellulose loadings over the frequency range of 50 Hz – 5MHz.

**Keywords**: electrical properties, dielectric loss, dielectric constant, AC electrical conductivity, microcrystalline cellulose