

Influence of Prolonged Mixing of Silicon Dioxide Nanoparticles on the Electrical Properties of Resin Nanocomposites

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Abstract. In today's world, scientists are focusing on developing new materials that provide lower costs, environmental sustainability or increased capabilities. One way to develop new materials is to modify conventional types already established in industry. An example is the development of composite materials with different types of matrices or fillers. In the last two decades, scientific work has mainly focused on the incorporation of nanofillers into conventional and used matrices such as resins, thermoplastics such as polyethylene or others. One of the issues in performing these modifications is the process of incorporation of nanoparticles into matrices, which is problematic in many aspects. This paper focuses on the effect of silica nanoparticles with different incorporation methods into polyester-imide resin (PEI). The main objective of this experiment was to find the optimal way of the process of mixing nanoparticles with the resin. Thus, this optimal process can be used in follow-up experiments to develop a new type of insulating material for high voltage applications. In this experiment, conventional dielectric parameters such as relative permittivity, dissipation factor, volume resistivity and dielectric strength were diagnosed.