

## Dielectric Properties and a.c. Conductivity of Epoxy/Alumina Silicate NGK Composites

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### Abstract

Alumina silicate powder which is extracted from the obsolete spark plug NGK (insulator part as a filler) has been used to produce epoxy/alumina silicate composite. The dielectric behavior of the composite materials (epoxy resin-alumina silicate NGK) is analyzed as a function of the filler content, temperature and frequency. AC conductivity and impedance are also studied. The results show that the permittivity, dielectric loss and loss tangent for all composites increase with increasing alumina silicate NGK filler content.

### Keywords

Polymer-Matrix Composites, Dielectric Properties, Epoxy, Alumina Silicate

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### 1. Introduction

Composites which are made of polymer with inorganic filler have been successfully used in electrical and electronic industries. These systems are considered heterogeneous and their electrical characteristics depend on several factors such as volume fraction, size, shape, conductivity of the filler, the adhesion between the filler and the polymer and the method of processing. The advantage of such composites is that it can be produced to exhibit enhanced and compatible properties that the constituent materials may not exhibit [1]-[4].

Filler can improve the mechanical, thermal and electrical (conductivity and permittivity) properties. It can lower the shrinking in addition to the price reduction consideration. In order to achieve both thermally conduct-

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