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## Attenuation performance of OPEFB-PCL composites incorporating NZF filler for microwave absorbing applications at X-band region

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The insulating properties of Ni–Zn ferrites can be improved by the addition of various types of insulating materials such as polymers, fiber, etc. In this connection, ferrite–polymer composites have been subjected to wide research, because they have many applications: microwave devices and telecommunication applications, electromagnetic interference shielding and microwave absorption. Dielectric and magnetic properties of such composites will depend on the size, shape and amount of filler addition. Nickel Zinc Ferrite ($Ni_{0.5}Zn_{0.5}Fe_2O_4$) or (NZF) material were prepared by using conventional solid-state reaction technique. This study highlights the development of microwave absorbing material from NZF by the addition of fiber and polycaprolactone. Thermal Hake blending machine was adopted to blend the powder structure of $Ni_{0.5}Zn_{0.5}Fe_2O_4$-PCL-OPEFB which resulted to a homogeneous. These composites were characterized by Fourier transform infrared spectrometer and scanning electron microscopy (SEM). The thermal degradation behaviour for composites was analyses by thermogravimetric analysis (TGA) and (DTG). The complex permeability was measured over a wide frequency range from 8GHz to 12GHz at room temperature. From our studies, it is observed that the values of permeability increased with an increase in NZF content. The permeability measured by material measurement software (Agilent 85071) with vector network analyser. A rectangular waveguide device connected with a microwave vector network analyser (VNA) is used to measure the reflection and transmission parameters of composites (|S21| and |S11|) respectively, in different percentage of NZF filler. The results showed that the reflection/transmission ratio can be modified for all composite samples of 1mm limited thickness. It is observed that both the values of reflection and transmission change with filler change in composites.

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