

Electromagnetic shielding properties of epoxy composites with hybrid filler nanocarbon/BaTiO₃

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The investigation of microwave shielding properties (range 26–37.5 GHz) of composite structures based on epoxy resin L285 and hybrid filler graphite nanoplatelets/BaTiO₃ nanoparticles has been conducted. Fig.1 presents the measured data on electromagnetic radiation (EMR) transmission index for bulk CMs 4wt.%GNP/30wt.%BaTiO₃/L285 and for multi-layered honeycomb structure based on this CMs. The simulation of the EMR transmission and reflection indexes

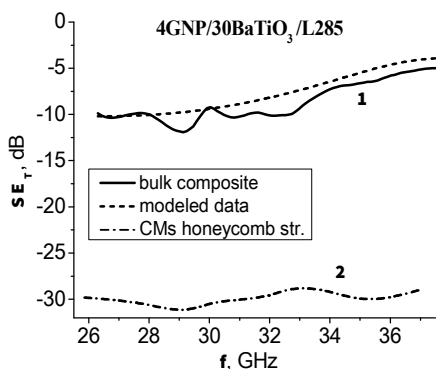


Figure 1. Transmission of CM structures 4wt.%GNP/30wt.%BaTiO₃/L285: 1 – bulk sample, 2 – honeycomb multilayer structure. Dashed line – modeled data for bulk composite from experimental $RL(f)$ and $SE_T(f)$ plots via optimization ($\epsilon' = 15.75$, $\tan\delta = 0.070$, sample thickness is 2.005 mm)

performed in C++ environment [1] via minimization of difference between experimental and modeled values of SE_T and RL allowed us to determine the permittivity ϵ' and dielectric loss tangent $\tan\delta$ and for bulk composite 4wt.%GNP/30wt.%BaTiO₃/L285 $\epsilon' = 15.75$, $\tan\delta = 0.070$. These values of ϵ' , $\tan\delta$ correlate with permittivity and dielectric loss, determined from of AC conductivity measurements. So, ϵ' is equal to 14.8–15.4, and $\tan\delta$ is equal to 0.022–0.06 in the frequency range 10^4 – 10^6 Hz.

1. Vovchenko L., Lozitsky O., Sagalianov I., Matzui L., Launets V. Microwave properties of one-dimensional photonic structure composed of dielectric and composite layers filled with nanocarbon // Nanoscale Research Letters -2017. -12. -P. 269