

ELECTROMAGNETIC PROPERTIES OF 3D-PRINTED CARBON–FERROELECTRIC OR FERROMAGNETIC COMPOSITES

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3D-printed carbon structures filled with ferroelectric (BaTiO₃) or ferromagnetic nanoparticles were investigated in low (20 Hz–1 MHz) and microwave (26–37 GHz) frequency ranges. These structures possess rather high electrical conductivity in the low-frequency range (about several S/cm) and excellent dielectric properties in the microwave range [1-3]. The electrical transport is thermally activated and can be attributed to electron transport through various defects. The electromagnetic properties of the investigated structures in the microwave range are very attractive. For example, the absorption of a 2 mm-plate with 46 wt. % of BaTiO₃ at 30 GHz is 50%. The impact of BaTiO₃ nanoparticles on the dielectric properties of the hybrid structures is positive over a wide frequency range, and the highest dielectric losses are observed for structures with 46 wt. % BaTiO₃.

References

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