

Microwave Absorbers Based on Nickel-Containing Powdered Activated Charcoal

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2025

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Keywords: Absorption Coefficient, Powdered Activated Charcoal, Chemical Deposition of Nickel Nanoparticles, Electromagnetic Radiation.

Abstract: The patterns of changes in the electromagnetic radiation absorption characteristics in the frequency range of 2.0–17.0 GHz of materials based on nickel-containing powdered activated charcoal are presented and substantiated depending on the duration of the process of deposition of nickel nanoparticles from aqueous solutions implemented during its production. These materials are made by filling containers formed from a self-adhesive polymer film with particles of such charcoal. A foil-coated polymer film is attached to one of the outer surfaces of the walls of these containers. The thickness of these materials was 0.3 cm. It was established that their values of the electromagnetic radiation absorption coefficient in the frequency range 2.0–17.0 GHz reach of 0.9. The width of the electromagnetic radiation effective absorption band of materials based on nickel-containing powdered activated charcoal during the production of which the duration of the process of nickel nanoparticles deposition was 5.0 min is equal to 10.0 GHz, and for materials based on nickel-containing powdered activated charcoal during the production in which the duration of the

process of nickel nanoparticles deposition was 10.0 and 15.0 min, it is 10.6 and 10.8 GHz, respectively. The average value of electromagnetic radiation absorption coefficient in the effective absorption band of the listed materials is 0.75, 0.77, and 0.82 rel. units respectively. It should be noted that the width of the electromagnetic radiation effective absorption band of materials manufactured in the above manner based on powdered activated charcoal is 6.7 GHz, and their average value of the electromagnetic radiation absorption coefficient in the specified band is 0.74 rel. units. The studied materials are among the basic materials of electronic technology and can be used to ensure electromagnetic compatibility of electronic devices, as well as microwave devices.

Publication source: Microwave Absorbers Based on Nickel-Containing Powdered Activated Charcoal / O.V. Boiprav, V. A. Bogush, V. S. Mokerov, E. S. Belousova // Inorganic Materials: Applied Research. – 2025. – Vol. 16. – P. 272–277. – DOI : <https://doi.org/10.1134/S2075113324701636>.