

Simulation of Reflection Loss for Carbon and Nickel-Carbon Thin Films

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Abstract : Maximal radar wave absorbing cannot be achieved by shaping alone. We have to focus on the parameters of absorbing materials such as permittivity, permeability, and thickness so that best absorbing according to our necessity can happen. The real and imaginary parts of the relative complex permittivity (ϵ_r and ϵ_r') and permeability (μ_r and μ_r') were obtained by simulation. The microwave absorbing property of carbon and Ni(C) is simulated in this study by MATLAB software; the simulation was in the frequency range between 2 to 12 GHz for carbon black (C), and carbon coated nickel (Ni(C)) with different thicknesses. In fact, we draw reflection loss (RL) for C and Ni-C via frequency. We have compared their absorption for 3-mm thickness and predicted for other thicknesses by using of electromagnetic wave transmission theory. The results showed that reflection loss position changes in low frequency with increasing of thickness. We found out that, in all cases, using nanocomposites as absorbance cannot get better results relative to pure nanoparticles. The frequency where absorption is maximum can determine the best choice between nanocomposites and pure nanoparticles. Also, we could find an optimal thickness for long wavelength absorbing in order to utilize them in protecting shields and covering.

Keywords : absorbing, carbon, carbon nickel, frequency, thicknesses

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