

Radiofrequency characteristics of the soft magnetic nanoceramic Fe:BN

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Structural and radiofrequency characteristics of the soft magnetic composite Fe:BN are reported. The sample of 95:5 % wt ratio was obtained by application of the hot isostatic pressing method at 8 GPa pressure and T=1450 C. Scanning electron microscope studies revealed ceramic-like structure of iron grains separated by thin layer of hexagonal boron nitride. Such a structure significantly increases many important parameters such as electric resistivity and corrosion resistance etc. The frequency dependence of permeability was investigated at room temperature in the range 1 MHz-1 GHz. It was found that magnetic permeability is frequency independent up to 20 MHz with value of about 22 with low loss factor ($\text{tg}\delta < 1$) up to 200 MHz. Taking into account very high value of the saturation of magnetic induction of about 2 T it could be concluded that Fe:BN nanoceramic is very promising for radiofrequency applications.