

# Influence on the microwave characteristics of Y-type polycrystalline hexaferrite

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We report results from studies on the microwave properties of Y-type polycrystalline hexaferrite synthesized by sol-gel auto-combustion and used as a filler in a composite microwave absorbing material. The reflection losses of the Y-type hexaferrite powder dispersed homogeneously in a polymer matrix of silicon rubber were investigated in the 1–20 GHz range in both the absence and the presence of a magnetic field. We used a permanent magnet with a strength of 1.4 T with the magnetic force lines oriented perpendicularly to the direction of the electromagnetic wave propagation. In the case without magnetic field, the microwave reflection losses reached the maximum value of 34.63 dB at 6.19 GHz in the Ku-band, while applying the magnetic field resulted in a remarkable and rather unexpected change in these values, namely, a maximum value of 21.13 dB at 8.95 GHz. The sensitivity of the microwave properties of the composite material to the external magnetic field was manifested by a decrease in the attenuation of the reflected wave. Thus, at a fixed thickness  $t_m$  of the composite, the attenuation peak frequency can be adjusted to a certain value either by changing the filling density or by applying an external magnetic field.

**Keywords:** Y-type hexaferrite, microwave properties, reflection losses, external magnetic field.

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