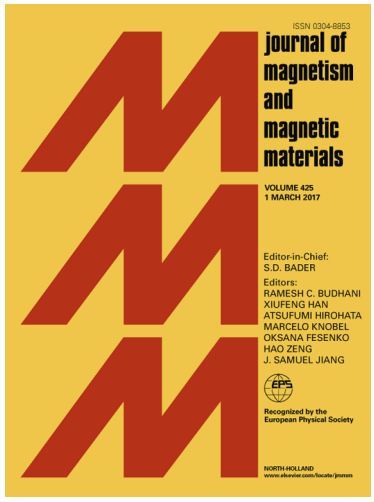

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Enhanced Microwave Absorption of Barium Cobalt Hexaferrite Composite with Improved Bandwidth via c-Plane Alignment

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Abstract: Planar hexaferrite $BaCo_2Fe_{16}O_{27}$ was prepared by a simple adsorbent combustion method. The $BaCo_2Fe_{16}O_{27}$/paraffin composite with 45 vol.% particles was subjected to a rotational orientation process in an external magnetic field, resulting in highly-oriented $BaCo_2Fe_{16}O_{27}$ composite with an alignment degree of 0.88. The oriented composite showed higher permeability in both real and imaginary parts as compared to its random counterpart. Significant enhancement of microwave absorbing performance was obtained for the oriented composite in 8 ~ 18 GHz due to the enhanced impedance matching and magnetic loss, displaying much stronger absorption and greater bandwidth (≤ -10 dB) than the random composite. Moreover, a thinner matching thickness can be achieved for a given matching frequency through the alignment of easy magnetization planes. The results showed that the c-plane alignment process holds promises for rational design of lightweight magnetic absorbers with planar anisotropy.

Keywords: Hexaferrite; Microwave absorption; Planar anisotropy; Rotational orientation.

1. Introduction

Microwave absorbing materials (MAMs) have attracted substantial attention over the past decades for their extensive applications in the fields of telecommunication and radar