Study on the permanent magnetic properties of a series of W-type hexagonal ferrites

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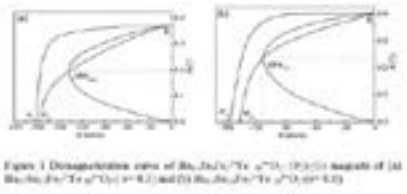
A series of substituted W-type hexagonal ferrites with composition Ba(Sr, La)$Me_2^{2+}Fe_{16}O_{27}$ at different temperatures was synthesized by a ceramic process. The finely milled slurry with a diameter of 0.8 μm was pressed into disk-shaped compacts in a pulsed magnetic field of 800 kA/m, which was parallel to the pressing direction. The phase composition, micromorphology, and magnetic properties of the particles were investigated by XRD, SEM and VSM. The permanent magnetic properties of the sintered magnets were measured by a B-H hysteresis equipment. The chemical composition of $Sr_{1-x}La_xZn_2Fe_{16}O_{27}$ (x=0-0.25) were synthesized. The results show that all the samples are a single phase as x below 0.20, which are the hexagonal structure and uniform distribution particles. The maximum values of the remanence (Br) and maximum energy product [$(BH)_{max}$] for the magnets have been obtained at x=0.10. W-type hexagonal ferrites $BaFe_2^{2+}Fe_{16}O_{27}$ have been successfully synthesized by the ceramic process in a nitrogen atmosphere during the process of pre-sintering and sintering. The permanent magnetic properties [H_{cj}, H_{cb}, Br and $(BH)_{max}$] of $Ba_{1-x}Sr_xFe_2^{2+}Fe_{16}^{3+}O_{27}$ ($0 \le x \le 1$) magnets were obtained. The remanence (Br) of the magnets increases at first, reaches to the maximum value (402.4 mT) at x=0.3 shown in Figure 1 and then decreases. The maximum energy product [$(BH)_{max}$] reaches the largest value (27.1 kJ/m^3) in all the magnets.



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Biography

Xiansong Liu has completed his PhD from Nanjing University and Postdoctoral studies from Bar-ilan University. He is the Director of Engineering Technology Research Center of Magnetic Materials at Anhui and a Professor of Anhui University. He has published more than 80 papers in reputed journals.

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