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Magnetic Properties of Zinc-substituted Strontium W-type hexaferrites of $SrZn_xFe_{(2-x)}Fe_{16}O_{27}$ ($0.0 \leq x \leq 2.0$)

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Since strontium W-type hexaferrite (SrW) is stable at the high temperature region of 1350–1440℃ in air, it is hard to obtain a pure phase of SrW at room temperature. A full substitution of divalent metal ions such as Mn, Zn, Co, and Ni for the Fe^{2+} site has been reported useful for obtaining the pure SrW phase at room temperature. Recently, we have successfully obtained the SrW pure phase at room temperature by annealing and subsequent furnace-cooling in a reduced oxygen atmosphere. Therefore, in this study, we tried to prepare the Zn-substituted SrW bulk samples with the compositions of $SrZn_xFe_{(2-x)}Fe_{16}O_{27}$ ($0.0 \leq x \leq 2.0$) in a reduced oxygen atmosphere, and identify the effects of Zn^{2+} substitutions on their magnetic properties. We also tried to investigate the phase stability region of $SrZn_xFe_{(2-x)}Fe_{16}O_{27}$. For this purpose, samples were annealed at the temperature region of 1100–1350℃ for 2 h in $PO_2 = 10^{-3}$ atm. As a result, the saturation magnetization of the samples increased with increasing x from 0 to x = 1.5, and the phase stability region decreased with increasing x. Details will be presented for a discussion