Magnetic properties of Zn-substituted strontium W-type hexaferrites

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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. There have been many reports arguing that the pure SrW phase could be stabilized by a substitution of the Fe^{2+} ions with other divalent metal ions such as Mn, Zn, Co, and Ni. However these reports are on the full substitution for the Fe^{2+} sites. Thus, the effect of a partial substitution of divalent metals for the Fe^{2+} sites on the magnetic properties has never been reported. We tried to prepare the Zn-substituted SrW bulk samples with the compositions of $SrFe_{(2-x)}Zn_xFe_{16}O_{27}$ ($0.0 \leq x \leq 2.0$) in a reduced oxygen atmosphere. We could successfully fabricate partially Zn-substituted SrW hexferrties at the sintering temperature region of 1100-1350℃ for 2 h in 1000 ppm O_2 ($PO_2 = 10^{-3}$ atm) atmosphere and subsequent furnace-cooling, The effects of Zn-substituted SrW hexferrties on their magnetic properties will be presented for a discussion.