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Synthesis of Hard Magnetic Material from Secondary Resources

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Abstract : Strontium hexaferrite (SrFe12O19; Sr-ferrite) is one of the well-known materials for permanent magnets. In this study, M-type strontium ferrite was prepared by following the conventional ceramic method from steelmaking by-product. Initial materials; SrCO3 and by-product, were mixed together in the composition of SrFe12O19 in different Sr/Fe ratios. The mixtures of these raw materials were dry-milled for 6h. The blended powder was pre-sintered (i.e. calcination) at 1000°C for different times periods, then cooled down to room temperature. These pre-sintered samples were re-milled in a dry atmosphere for 1h and then fired at different temperatures in atmospheric conditions, and cooled down to room temperature. The produced magnetic powder has a dense hexagonal grain shape structure. The calculated energy product values for the produced samples ranged from 0.3 to 2.4 MGOe.

Keywords : hard magnetic materials, ceramic route, strontium ferrite, synthesis
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