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Synthesis of Strontium Hexaferrite Nano Particles Via Wet Chemical Route

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ABSTRACT:

Hexaferrites are considered as a magnetic material, which can be used as a permanent memory storage devices. Different chemical routes are used to prepare Strontium hexaferrite powders like ceramic route, co-precipitation method, sol-gel process, auto-combustion route, hydrothermal, micro-emulsion etc. Convention ceramic route requires high temperature calcinations (1400 ºC). Here Strontium hexaferrite $SrFe_{12}O_{19}$ particles containing polyoxyethelene (20) sorbitan monoolate (Tween-80) were synthesized by a chemical co-precipitation technique with a precipitator $NH_3.H_2O$. The prepared Sr-M hexaferrite precipitates were heat treated at various temperatures 650 ºC, 750 ºC, 850 ºC, 950 ºC and 1100 ºC for 4 hrs in a muffle furnace. The obtained Sr-M powders were characterized by using various instrumental techniques like FTIR, TGA, XRD, SEM and VSM. Their physical as well as magnetic properties were compared. It was observed from XRD results that heat treatment conditions play significant role in the formation of pure $SrFe_{12}O_{19}$ hexaferrite phase and also in the grain size. The estimated particle size is of the order of nanometer when suitable calcinations temperature is applied. SEM micrographs show an increase in crystallite size of the resultant $SrFe_{12}O_{19}$ hexaferrite particles sintered at higher temperature (1100 ºC).