

Microstructure and magnetic properties of Zinc ferrite particles synthesized from metal hydroxide carbonate complex

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Zinc ferrite has normal spinel structure with zinc ions in the tetrahedral sites. However, recent researches on ultrafine zinc ferrite prepared by coprecipitation technique has showed defect crystal structures and abnormal magnetic properties. Zinc iron hydroxide carbonate complexes were synthesized using the reverse microemulsion process. To get ferrite particles, the carbonate complex particles had been calcined at 330°C for 6 hrs. The powder samples have been studied and characterized by means of powder X-ray diffraction (XRD), transmission electron microscopy (TEM), Mossbauer spectroscopy and a superconducting quantum interference device (SQUID) magnetometer. The zinc ferrite particles having an inversion parameter of about 0.28 were synthesized. The magnetic hysteresis loops observed at 5 K were caused by a result of the relatively strong coupling between A and B sites. The powders were found to have a relatively high inversion parameter compared to normal zinc ferrite.