

Synthesis and characterization of barium hexaferrites derived from steel waste by ammonium nitrate salt melt synthesis

ABSTRACT

In this paper, a series of barium hexaferrite $\text{BaFe}_{12}\text{O}_{19}$ with different powder to salt ratio (1:3, 1:4, 1:5) were prepared using ammonium salt melt technique. Iron oxide were process from steel waste product were mixed with barium carbonate, used as starting materials to produce barium hexaferrites. The ammonium nitrates in this experiment act as oxidizing agent in this synthesis. The $\text{BaFe}_{12}\text{O}_{19}$ powders were sintered at 1300°C for six hours and characterized using X-ray diffraction (XRD), Fourier transform Infrared (FTIR), Vibrating Sample Magnetometer (VSM) and Field emission Scanning Microscope (FeSEM) to investigate its crystallography, magnetic properties and morphology. The maximum coercivity and saturation magnetization obtained for sample ratio 1:3 of 1017 G and 90.9 emu/g, respectively. Increase the salt ratio decrease the coercivity and saturation magnetization values.

Keyword: Barium hexaferrite; Steel waste; Ammonium salt melt technique