

Microstructure and Magnetic Properties of Barium Hexaferrite Produced by Sol Gel Auto combustion For Radar Absorber Material (RAM) Application

Widyastuti -, Endah Kharismawati, Mochamad Zainuri and Hosta Ardhyanta

Universiti Tun Hussein Onn Malaysia, Malaysia

dafitferiyanto@yahoo.co.id

Abstract— Barium hexaferrite ($\text{BaFe}_{12}\text{O}_{19}$) with hexagonal structure had been known as the high performance magnetic for Radar Absorber Material (RAM). Barium hexaferrite (BaM) was synthesized by sol gel auto combustion to get a homogeneous nanoparticle of BaM. It was obtained from solution mixture between barium nitrate and ferri nitrate nonahidrat with precipitation of ion barium (Ba^{2+}) and ferri (Fe^{3+}) by solution of sodium hydroxide. Samples were prepared with mol ratio of Fe / Ba 11, added ammoniac in order to get pH varies in 7.5; 9, and 11. Combustion process is induced by adding citric acid. The stirring time were performed in 1, 2, and 3 hours, respectively. The effect of pH, stirring time, microstructure, phase, and magnetic properties were investigated using X-ray diffraction (XRD), Scanning Electron Microscope (SEM) and a vibrating sample magnetometer (VSM). The results showed that the highest coercivity was 0.6 Tesla and the smallest crystal size 414.409 nm was obtained for pH 7.5 and stirring time in 2 hours. Moreover, the largest magnetic saturation 55.54 emu/g was reached for pH 7.5 with stirring time within 1 hour.

Keywords: *barium hexaferrite; sol gel; pH*