MAGNETIC AND ELECTRICAL PROPERTIES CHARACTERIZATION OF CORE-SHELL COMPOSITE BARIUM M-HEXAFERRITE DOPED BY Zn ION (BaFe$_{12-x}$Zn$_x$O$_{19}$)/POLYANILINE

Student Name : Novita Ratnasari Siswiyanto
Student Identity : 1109 100 014
Departement : Fisika, FMIPA-ITS
Advisor : Dr. M. Zainuri, M.Si

Abstract

Research has been done on the effect of variations in ion doping Zn 0.3; 0.5; 0.7 on Barium M-Hexaferrite (BaFe$_{12-x}$Zn$_x$O$_{19}$) powder with a simple coprecipitation method undertaken to synthesize Barium M-Hexaferrite (BaFe$_{12-x}$Zn$_x$O$_{19}$) and calcined at temperature of 1000°C for 4 hours. And in-situ polymerization method for the synthesis of core-shell composite PANi/BaFe$_{12-x}$Zn$_x$O$_{19}$. PANi/BaFe$_{12-x}$Zn$_x$O$_{19}$ characterized by VSM and two point probe method. Giving doping Zn ions are influence for the magnetic properties become more soft magnetic like the BaFe$_{11.3}$Zn$_{0.7}$O$_{19}$ ie with magnetic remanence value of 10.79 emu/g and coercivity field of $34.57 \times 10^{-2}$ T. Conductivity of composites with various filler ion doping on the $3.9 \times 10^{-3} - 4.8 \times 10^{-3}$ S/cm. From the results of TEM observation showed that the composites have a core-shell structure, with BaFe$_{12-x}$Zn$_x$O$_{19}$ as a core coated by PANi with an average diameter of $\sim 190$ nm composite with filler diameter $\sim 101(6)$ nm.

Keywords: PANi/BaFe$_{12-x}$Zn$_x$O$_{19}$, Zn, coprecipitation, in-situ polymerization, magnetization, conductivity