ABSTRAK

MATERIAL *ABSORBER* GELOMBANG ELEKTROMAGNETIK BERBASIS $(La_{0.8}Ba_{0.2})(Mn_{(1-x)/2}Zn_xFe_{(1-x)/2})O_3$ (x = 0 - 0.6)

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Telah dilakukan penelitian mengenai material *absorber* gelombang elektromagnetik berbasis $(La_{0.8}Ba_{0.2})(Mn_{(1-x)/2}Zn_xFe_{(1-x)/2})O_3$ (x = 0 – 0,6) menggunakan metode reaksi padatan. Bahan magnetik ini dibuat dari oksida penyusun La_2O_3, $BaCO_3$, ZnO, Fe_2O_3, dan $MnCO_3$. Campuran di*milling* dengan *High Energy Milling* selama 5 jam kemudian disintering pada suhu 1000°C selama 5 jam. Karakterisasi dilakukan dengan X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Energy Dispersive Spectroscopy (EDS), Particle Size Analyzer (PSA), Vibrating Sample Magnetometer (VSM), dan Vector Network Analyzer (VNA). Identifikasi fasa dengan XRD menunjukkan bahwa kemampuan substitusi ion Fe^{3+} dan Zn^{2+} optimum pada x = 0.2 dengan komposisi $(La_{0.8}Ba_{0.2})(Mn_{0.4}Zn_{0.2}Fe_{0.4})O_3$. Peningkatan kandungan Zn menyebabkan timbulnya fasa lain yaitu MnO dan ZnO, sesuai dengan pengamatan SEM menunjukkan terbentuknya struktur yang tidak homogen. Hasil analisis PSA menunjukkan ukuran partikel meningkat ketika x>0.2 yaitu 1801.31, 1298.57, 1473.06, dan 1635.59 nm. Analisis VSM menunjukkan penurunan Hc, Mr, dan Ms seiring meningkatnya kandungan Zn. Serapan gelombang elektromagnetik terbesar ditunjukkan oleh konsentrasi x = 0.2 yaitu sebesar 96%.

Kata kunci: Fasa, penyerapan, perovskite $(La_{0.8}Ba_{0.2})(Mn_{(1-x)/2}Zn_xFe_{(1-x)/2})O_3$, reaksi padatan.

ABSTRACT

ELECTROMAGNETIC WAVE ABSORBER MATERIALS WITH $(La_{0.8}Ba_{0.2})(Mn_{(1-x)/2}Zn_xFe_{(1-x)/2})O_3$ (x = 0 - 0.6)

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Electromagnetic wave absorber materials with $(La_{0.8}Ba_{0.2})(Mn_{(1-x)/2}Zn_xFe_{(1-x)/2})O_3$ (x = 0-0.6) had been synthesized using solid-state reaction . Precursors use were La_2O_3, $BaCO_3$, ZnO, Fe_2O_3, dan $MnCO_3$. The sample were characterized using X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Energy Dispersive Spectroscopy (EDS), Particle Size Analyzer (PSA), Vibrating Sample Magnetometer (VSM), and Vector Network Analyzer (VNA). The phase identification with XRD shows that the substitution ability of Fe^{3+} and Zn^{2+} ion was optimum at x = 0.2 with composition $(La_{0.8}Ba_{0.2})(Mn_{0.4}Zn_{0.2}Fe_{0.4})O_3$. Increasing Zn content causes the emergence of other phases of MnO and ZnO, according to SEM observations indicating the formation of non-homogeneous structures. PSA analysis results show that particle size increases when x> 0.2 were 1801.31, 1298.57, 1473.06, and 1635.59 nm. VSM analysis shows decreases in Hc, Mr, and Ms as the Zn content increases. The biggest electromagnetic wave absorption was shown by the concentration x = 0.2 which was 96%.

***Keywords**: Absorption, phase, perovskite $(La_{0.8}Ba_{0.2})(Mn_{(1-x)/2}Zn_xFe_{(1-x)/2})O_3$, solid state*