Perubahan nilai resistansi dan rasio magnetoresistansi pada sampel La0,67Ba0,33Mn1-xTixO3 (x = 0; 0,02; 0,04 ; dan 0,06) = Changes of resistance and ratio magnetoresistance the sample La0, 67Ba0,33Mn1-xTixO3 (x = 0; 0,02; 0,04 and 0,06)

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Abstrak

Sampel La0,67Ba0,33Mn1-xTixO3 dengan x = 0; 0,02; 0,04 dan 0,06 dari bahan dasar La2O3, BaCO3, MnCO3, dan TiO2 disentesis dengan menggunakan metode mechanical alloying. Identifikasi fasa dilakukan dengan menggunakan difraksi sinar X dan refinement GSAS diperoleh single phase dengan struktur kristal monoklinik. Pengukuran terhadap nilai resistansi dan magnetoresistansi (MR) sampel diukur menggunakan Four Point Probe (FPP) sedangkan nilai magnetisasi diukur menggunakan permagraph.
Berdasarkan hasil pengukuran pemagraph didapatkan La0,67Ba0,33Mn1-xTixO3 bersifat soft magnetik dan penambahan Ti menurunkan nilai magnetisasi. Berdasarkan hasil pengukuran FPP nilai resistansi meningkat seiring penambahan Ti. Nilai magnetoresistansi sampel pada umumnya mengalami penurunan kecuali pada x= 0,06. Untuk x=0 rasio magnetoresistansi paling besar yaitu -3,437 % pada temperatur ruang.
Penambahan Ti menyebabkan rasio ion Mn4+ berkurang tersubtitusi ion Ti4+ terjadi pelemahan interaksi Double Exchange sehingga meningkatkan nilai resistansi dan menurunkan rasio magnetoresistansi.
<hr>Perovskite compounds La0,63Ba0,33Mn1-xTixO3 with composition x = 0 ; 0,02 ; 0,04 and 0,06 were made by synthesizing the basic materials La2O3, MnCO3, BaCO3, and TiO2 by mechanical alloying methods. This four basic ingredients are mixed using Vibrating Ball Milling for 10 hours, calcined at 800oC temperature for 10 hours, in compacting, and sintering at 1100oC temperature for 12 hours. Then be indentified by X-Ray difraction phase and GSAS refinement and obtained sample La0,67Ba0,33Mn1-xTixO3 single phase for all composition x, which has monoclinic crystal structure. magnetization measurements were conducted with pemagraph, while the Four Point Probe (FPP) is performed to measure the value of resistance and magnetoresistance (MR) in the sample. Based on the results of measurements obtained pemagraph La0, 67Ba0, 33Mn1- xTixO3 are soft-magnetic and the addition of Ti lowers the value of the magnetization.
Based on the measurement results FPP the resistance value increases with the addition of Ti. Sample magnetoresistance values generally decreased except for x=0,06. For x = 0 the large magnetoresistance ratio is -3.437% at room temperature . The addition of Ti causes Mn4 + ion ratio decreases substituted Ti4+ ions weakening Double Exchange interaction thus increasing resistance and lowering the value of magnetoresistance ratio.