

Studi sifat kelistrikan dan efek magnetoresistansi $\text{La}_{0,8}(\text{Ca}_{1-x}\text{Ag}_x)_{0,2}\text{MnO}_3$ ($x = 0; 0,05; 0,15; 0,2$) yang disintesis dengan metode sol gel = Study of electrical properties and magnetoresistance effect of $\text{La}_{0,8}(\text{Ca}_{1-x}\text{Ag}_x)_{0,2}\text{MnO}_3$ ($x = 0; 0,05; 0,15; 0,2$) materials syntesized by sol gel method

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Abstrak

Pengaruh doping Ag terhadap sifat listrik dan magnetoresistansi material $\text{La}_{0,8}\text{Ca}_{1-x}\text{Ag}_x\text{MnO}_3$ $x = 0; 0,05; 0,15; 0,2$ telah diinvestigasi. Material $\text{La}_{0,8}\text{Ca}_{0,2}\text{MnO}_3$ merupakan salah satu member dari material perovskite manganite yang mempunyai struktur umum ABO_3 . Material yang dihasilkan dikarakterisasi menggunakan XRD, SEM, dan Cryogenic Magnetometer. Hasil karakterisasi XRD didapatkan material memiliki fasa tunggal, dengan menggunakan metode pencocokan rietveld diketahui pendopongan Ag sebesar 0 le; x le; 0,05 memilki struktur orthorombik, namun ketika doping Ag sebesar x ge; 0,15 material mengalami transformasi struktur menjadi rhomohedral. Karakterisasi SEM menunjukkan perubahan ukuran rata-rata grain ketika doping silver meningkat. Dari hasil EDX terlihat unsur Ag telah berhasil tersubstitusi kedalam matriks $\text{La}_{0,8}\text{Ca}_{0,2}\text{MnO}_3$ dengan nilai komposisi dari unsur-unsur yang ada didalamnya mendekati nilai komposisi perhitungan. Hasil karakterisasi cryogenic magnetometer menunjukkan pendopongan silver ke dalam ion Ca pada material $\text{La}_{0,8}\text{Ca}_{0,2}\text{MnO}_3$ dapat menurunkan resistivitas bahan dan menaikkan nilai temperatur transisi metal ke isolator TMI , namun pada $x = 0,2$ resistivitas bahan kembali meningkat yang diikuti penurunan nilai TMI. Persen magnetoresistansi MR menunjukkan peningkatan ketika bahan $\text{La}_{0,8}\text{Ca}_{0,2}\text{MnO}_3$ didoping oleh 5 dan 15 silver pada ion Ca-nya, namun ketika didoping silver sebesar 0,2 persen MR kembali menurun, yang mana MR terbesar yang didapatkan pada penelitian ini adalah 6 dengan komposisi doping $x = 0,15$.

<hr><i>The effect of Ag doping on electrical properties and magnetoresistance of $\text{La}_{0,8}\text{Ca}_{1-x}\text{Ag}_x\text{MnO}_3$ $x = 0, 0,05, 0,15, 0,2$ materials has been investigated. $\text{La}_{0,8}\text{Ca}_{0,2}\text{MnO}_3$ material is one member of the perovskite manganite material that has a general structure ABO_3 . Samples that have been synthesized, XRD measurement were taken. After that, the samples are compressed using dice, in which has a diameter 12 mm. So in here, the shape of the samples will be pellet. The pellet samples characterized using SEM EDX and Cryogenic Magnetometer. XRD characterization results obtained, all the samples has a single phase, by using rietveld refinement technique it is known that the substitution of Ag with large doping $x \geq 0,15$ occurs the transformation of structure to rhombohedral. SEM characterization indicates a grain size change when the level of doping Ag increases. The EDX results indicate that the silver element has successfully entered into $\text{La}_{0,8}\text{Ca}_{0,2}\text{MnO}_3$ matrix with the composition value of the elements contained therein close to the composition value from the calculation. Cryogenic Magnetometer results show that substitution of Ag into the material $\text{La}_{0,8}\text{Ca}_{0,2}\text{MnO}_3$, it can decrease the resistivity of the material and increase the value of TMI of the material, but when doping silver was 0,2, The resistivity of material returns increases and TMI value decreases. The Percentage of magnetoresistance MR shown an increase when the $\text{La}_{0,8}\text{Ca}_{0,2}\text{MnO}_3$ material was doped by 5 and 15 silver, but when silver doped 0,2 , percentage of MR decreased again, the largest MR obtained in this study was 6 with doping Ag was 0,15. </i>