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Studi sifat kelistrikan dan efek magnetoresistansi La0,8 (Ca1-xAgx)0,2MnO3 (x = 0; 0,05; 0,15; 0,2) yang disintesis dengan metode sol gel = Study of electrical properties and magnetoresistance effect of of La0,8 (Ca1-xAgx) 0,2mno3 (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 La0,8 Ca1-xAgx 0,2MnO3 x = 0; 0,05; 0,15; 0,2 telah diinvestigasi. Material La0,8Ca0,2MnO3 merupakan salah satu member dari material perovskite manganite yang mempunyai struktur umum ABO3. Material yang dihasilkan dikarakterisasi menggunakan XRD, SEM, dan Cryogenic Magnetometer. Hasil karakterisasi XRD didapatkan material memiliki fasa tunggal, dengan menggunakan metode pencocokan rietveld diketahui pendopingan 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 La0,8Ca0,2MnO3 dengan nilai komposisi dari unsur-unsur yang ada didalamnya mendekati nilai komposisi perhitungan. Hasil karakterisasi cryogenic magnetometer menunjukkan pendopingan silver ke dalam ion Ca pada material La0,8Ca0,2MnO3 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 La0,8Ca0,2MnO3 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>The effect of Ag doping on electrical properties and magnetoresistance of La0,8 Ca1 xAgx 0,2MnO3 x 0 0,05 0,15 0,2 materials has been investigated. La0,8Ca0,2MnO3 material is one member of the perovskite manganite material that has a general structure ABO3. 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 rietvield refinement technique it is known that the substitution of Ag with large doping x ge 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 elementhas successfully entered into La0,8Ca0,2MnO3 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 La0,8Ca0,2MnO3 , 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 La0,8Ca0,2MnO3 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.