

Efek magnetoresistansi dan studi efek magnetokalorik bahan manganat oksida $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ ($x = 0,01; 0,03; 0,05$) =
Magnetoresistance effect and magnetocaloric effect study of manganites $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ ($x = 0,01; 0,03; 0,05$)

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Abstrak

Telah dilakukan sintesis bahan magnetik $\text{La}_{0,67}\text{Ca}_{0,33}\text{MnO}_3$ (LCMO) serta $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ $x = 0,01; 0,03; 0,05$ (LBCMO) dengan metode reaksi padatan untuk kemudian dilihat pengaruhnya terhadap parameter kisi, sifat magnetoresistansi, serta efek magnetokalorik. Karakterisasi XRD menunjukkan bahwa seluruh sampel memiliki fasa tunggal dan pergeseran puncak terdeteksi akibat penambahan doping kalsium. Pengujian resistivitas di bawah medan magnet menunjukkan bahwa resistivitas meningkat dengan bertambahnya doping kalsium. Selain itu penambahan doping kalsium mengakibatkan pergeseran temperatur transisi metal-insulator (T_p) menuju region temperatur yang lebih rendah. Selain itu, penambahan doping kalsium mengakibatkan bervariasinya nilai rasio magnetoresistansi. Studi magnetokalorik dilakukan dengan menggunakan metode Xiong[6]. Kurva magnetokalorik dari sampel tidak menunjukkan trend yang tepat, karena perbedaan jenis bahan yang digunakan pada penelitian ini (polikristal) dengan penelitian referensi (epitaxial thin film).

.....Magnetic materials $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ $x = 0.01 - 0.05$ (LBCMO) has been synthesized using solid state reaction method in order to find the relations between doping agent Calcium and the perovskite's lattice, magnetoresistance and magnetocaloric effect. A characterization using X-Ray Diffractometer shows that all of the samples have single phase pattern with several peak shifts detected as the influence of increasing the doping content. A resistivity measurement under influence of magnetic field shows that the resistivity increases and the metal - insulator transition temperatur (T_p) shifted into lower temperatur region. In other case, introducing calcium dopant into the main compound LBMO also give the effect of variation in magnetoresistance ratio. Magnetocaloric study was carried by using Xiong's method[6]. Magnetocaloric's curve of the samples shows its inaccuracy in its trend because the sample for this research (polycrystalline) and reference's sample (epitaxial thin film) was different.