

Karakteristik magnetoresistansi dan efek magnetokalorik (MCE) material $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ = Characteristic of magnetoresistance and magnetocaloric effect (MCE) of $1\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ materials

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Abstrak

ABSTRAK

Telah dilakukan penelitian mengenai karakteristik magnetoresistansi dan efek magnetokalorik (MCE) material $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ ($x = 0; 0,01; 0,03; 0,05; 1$). Material $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ termasuk ke golongan perovskite manganites dengan struktur umum AMnO_3 ($A =$ logam tanah jarang trivalen dengan dopan ion divalen seperti Sr, Ba, Ca, dsb). Rietveld analysis hasil karakterisasi XRD menunjukkan bahwa $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ memiliki fasa tunggal dengan struktur kristal rhombohedral dan space group $R\text{-}3c$. Dengan uji semi-kuantitatif EDX telah dikonfirmasi kemurnian dari keseluruhan sampel ini. Meningkatnya konsentrasi doping Ca pada $\text{La}_{0,7}\text{Ba}_{0,3}\text{MnO}_3$ menyebabkan terjadinya distorsi kisi sehingga akan mempengaruhi proses transfer elektron yang terjadi. Akibatnya, akan mempengaruhi sifat listrik, magnetoresistansi, dan magnetokalorik sampel. Nilai rasio magnetoresistansi (MR) dari $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ cukup tinggi yaitu $\sim 30\%$.

ABSTRACT

The characteristic of magnetoresistance and magnetocaloric effect (MCE) of $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ ($x = 0; 0,01; 0,03; 0,05; 1$) materials are reported. $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ material included in perovskite manganites family. Perovskite manganites have general structure AMnO_3 ($A =$ trivalent rare earth with divalent ion-doped such as Sr, Ba, Ca, etc). Rietveld analysis from XRD measurement confirmed that all samples are single phased. Semi-quantitative EDX analysis technique confirmed that all samples have compositional purity. Increasing of Ca dopant caused lattice distortion and will influencing electron transport process in this samples. Hence, it will impact to electrical properties, magnetoresistance, and magnetolaric properties in this samples. $\text{La}_{0,7}(\text{Ba}_{1-x}\text{Ca}_x)_{0,3}\text{MnO}_3$ material has magnetoresistance ratio $\sim 30\%$.