Studi struktur, sifat listrik dan magnet material perovskite manganite La0, 7Sr0, 2ba0, 1Mn1-xNixO3 (x = 0; 0,02; 0,05; 0,1) = Study of structure, electrical and magnetic properties of perovskite manganite materials La0, 7Sr0, 2ba0, 1Mn1-xNixO3 (x = 0; 0.02; 0,05; 0,1)

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Abstrak

Telah dilakukan penelitian mengenai struktur,sifat listrik, dan sifat magnet material perovskite manganites La0,7Sr0,2Ba0,1Mn1-xNixO3 x = 0; 0,02; 0,05; 0,1 yang disintesis dengan metode sol gel. Hasil karakterisasi XRD menunjukkan bahwa sampel memiliki fase tunggal dengan struktur rhombohedral dan space group R-3c. Pemberian sedikit doping nickel tidak mengubah struktur kristal, tetapi merubah nilai parameter kisi kristal. Karakterisasi SEM-EDS menunjukkan perubahan ukuran grain dan mengkonfirmasi unsur nickel berhasil tersubstitusi. Ukuran grain size semakin kecil seiring dengan penambahan konsentrasi nickel. Kurva histerisis yang dihasilkan menunjukkan bahwa pemberian doping nickel menurunkan sifat kemagnetan bahan yang ditunjukkan oleh penurunan nilai saturasi magnetisasi. Kurva resistivitas sebagai fungsi temperatur menunjukkan bahwa doping nickel meningkatkan besar resistivitas material. Hasil fitting dengan menggunakan model percolation menunjukkan penambahan konsentrasi nickel menurunkan nilai temperatur curie Tc dan temperatur transisi metal-isolator TM-I ke temperatur yang lebih rendah.
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The structure, electrical properties, and magnetic properties of perovskite manganite La0.7Sr0.2Ba0.1Mn1 xNixO3 x 0 0.02 0.05 0.1 material were synthesized by the sol gel method have been studied. The result of XRD characterization showed that sample has a single phase with rhombohedral structure and R 3c space group. Nickel doped on site Mn does not change the crystal structure but changes the lattice parameter. The SEM EDS characterization shows changes in grain size and confirms that site Mn succeeds substituted with nickel ion. Grain size decreased with the addition of nickel concentration. The hysteresis curve showed that nickel doped decreased magnetic properties of the material as indicated by the decrease in magnetization saturation value. Characterization of SEM EDX shows changes in grain size and confirms the nickel element successfully substituted. Resistivity curve as a function of temperature indicates that nickel doped increased resistivity. The result of fitting by using percolation model showed that the addition of nickel concentration decreased temperature curie Tc and metal isolator transition temperature TM I to lower temperature.