QC04

The numerical computation of self- demagnetization factor N in bonded magnets

Le Tuan Tu[1,3], Nguyen Van Vuong[3], Chong Oh Kim[1,2], Cheol Gi Kim[1,2]*

[1]Department of materials science and engineering, Chungnam National University, Deajeon, 305-764, Korea
[2]Research Center for Advanced magnetic materials (ReCAMM), Deajeon, 305-764, Korea
[3]Institute of Materials Science, VAST, 18 Hoang Quoc Viet, Cau Giay, Ha noi, Vietnam.

*Corresponding author: cgkim@cnu.ac.kr, Phone: +82 42 821 6632, Fax: +82 42 822 6272

The self-demagnetization effect in bonded magnets (BM), which are compacted from ferromagnetic particles embedded in a binder medium, was investigated by means of the numerical computation. It is shown that the self-demagnetization factor is dependent not only on the shape but also the granular structure of magnets. The calculated factors N as functions of the magnet shape, mass density and particle orientation have been presented. The influence of the self-demagnetization effect on the characterization of BMs is also discussed.

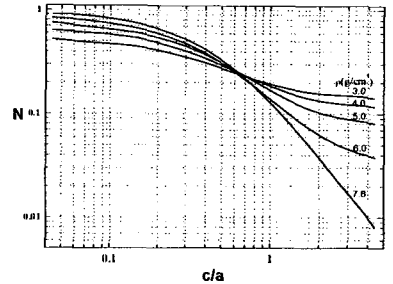

Fig. 3. The factor N versus c/a curves simulated for magnets compacted from cubic particles with various mass densities.

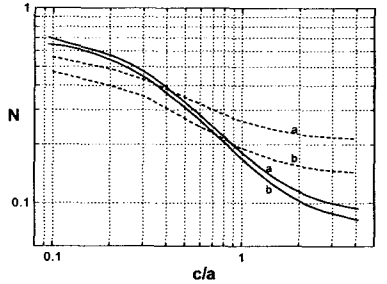

Fig. 4. The factor N versus c/a curves simulated for the bonded magnet compacted from shape-anisotropic particles in the magnetic field $H_{\perp}$ and the $H_{//}$

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Hopping Conduction Behavior with the Coulomb Effect in Colossal Magnetoresistance Materials

C. H. Lin*[1], S. L. Young[1], H. Z. Chen[1], M. C. Kao[2], Lance Horng[3]

[1]Department of Electrical Engineering, Hsiuping Institute of Technology, 11 Gunzye Road, Dali City, 41280 Taichung, Taiwan
[2]Department of Electronics Engineering, Hsiuping Institute of Technology, 11 Gunzye Road, Dali City, 41280 Taichung, Taiwan
[3]Department of Physics, Changhua University of Education, 1 Jiu-de Road, 500 Chunghua, Taiwan

*Corresponding author: jhlin@mail.hit.edu.tw, Phone: +886-4-24961179, Fax: +886-4-24961187

There has been a renewed interest in the nature of hopping correlation and colossal magnetoresistance in doped manganites for the past few years [1-3]. In this study, we report on the temperature dependence of resistivity measurements in $La_{0.2}Nd_{0.5}Pb_{0.3}MnO_3$ and $La_{0.2}Pr_{0.5}Pb_{0.3}MnO_3$ bulksamples in order to explore the hopping transport behaviour with the coulomb effect for the colossal magnetoresistance materials. The experimental observations reveal the exponential temperature dependence of resistivity $\rho(T)\infty\exp\left[(T_1/T)^n\right]$ with $n=1/2$, $T_1 \approx 18300$ for Nd doped compound and $T_1 \approx 23300$ for Pr doped compound, respectively, when system was the paramagnetic (PM) insulator at the high temperature range (T>TC). Evidence for the hopping conduction with Coulomb effects is presented in these CMR materials. By using the approximate method of the VRHconduction in the localization regime base on Efros and Shklovskii model, the localization length of eg electrons can be estimated with the relationship, $\xi = 2.8e^2/4\pi\varepsilon_0 k_B T_1$. The reasonable results of localization length can be evaluated to explain the possibility of the presence of the Coulomb interactions in these CMR materials.

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