Electrical Transport Properties of La-Doped SrTiO3

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ABSTRACT

In this study, La-doped SrTiO3(Sr1-xLaxTiO3 =0.02 ~ 0.3) bulk were prepared by solid-state reaction method and La-doped SrTiO3(Sr1-xLaxTiO3) thin films were grown on the Si(100) and SrTiO3(100) substrates by the off-axis rf magnetron co-sputtering system. In the experiment, we expect Sr2+ ions were replaced by La3+ ions in the samples, and introduced the electron carriers. However, the specimens turn into electrically conductive after annealing in mixed H2/Ar. The temperature dependence of resistivity and Hall coefficients were studied, and found that the transport properties, which can not be described by the free electron gas model, are related to the electron correlation systems in film specimens.

Keywords : Sr1-xLaxTiO3、electron correlation systems

Table of Contents

REFERENCES

[1]吳介帆, ” 電控式超導濾波器之製作暨特性研究 ” ,大葉大學碩士論文, 2005.

[2] Haruhiko OBARA, Atsushi YAMAMOTO, Chul-Ho LEE, Keizo KOBAYASHI1, Akihiro MATSUMOTO1 and Ryoji FUNAHASHI2, J. J. Appl. Phys. 43, L540 ~ L542.

[3] Hiroaki Muta, Ken Kurosaki, Shinsuke Yamanaka, Journal of Alloys and Compounds (2005) 392 ~ 309.

[4] Shingo Ohta, , Takashi Nomura, Hiromichi Ohta, Hideo Hosono, Kunihto Koumoto, Appl. Phys. Lett. 87 092108 (2005).

[5] J. F. Schooley, W. R. Hosler, E. Ambler, J. H. Becker, M. L. Cohen, and C.S. Koonce, Phys. Rev. Lett. 14, 305 ~ 1965.

[6] A. Baratoff and G. Binnig, Physica B 108, 1335 ~ 1981.

[7] E. R. Pfeiffer and J. F. Schooley, Phys. Lett. A 29, 589 ~ 1969.

[8] H. Suzuki, H. Bando, Y. Ootuka, I. H. Inoue, T. Yamamoto, K. Takahashi,and Y. Nishihara, J. Phys. Soc. Jpn. 65, 1529 ~ 1996.
[9] J. F. Schooley, W. R. Hosler, and M. L. Cohen, Phys. Rev. Lett. 12, 474 ~ 1964.
[10] M. Higuchi, K. Aizawa, K. Yamaya, K. Kodaira, J. Solid-State Chem. 92 (1991) 573 ~ 577.
[11] T. Okuda, K. Nakanishi, S. Miyasaka, and Y. Tokura, Phys. Rev. B 63, 113104 (2001).
[12] R. Moos, K.H. Hardtl, J. Appl. Phys. 8081 (1996) 393 ~400.
[13] Ralf Moos, Alain Gnudi, and Karl Heinz Hkdtl, J. Appl. Phys. 78, 5042 (1995).
[14] Shingo Ohta, Takashi Nomura, Hiromichi Ohta, Kunihto Koumoto, J. Appl. Phys. 97, 034106 (2005).
[15] S. Hashimoto, L. Kindermann, F.W. Poulsen, M. Mogensen, Journal of Alloys and Compounds 397 (2005) 245-249.
[16] David Olaya, Feng Pan, Charles T. Rogers, and John C. Price, Appl. Phys. Lett. 80 (2002) 2928 ~ 2930.
[17] K. O. Grosse-Holz, J. F. M. Cillessen, R. Waser, Applied Surface Science 96-98 (1996) 784-790.
[18] Shingo Ohta1, Takashi Nomura1, Hiromichi Ohta1,2,3, Masahiro Hirano3, Hideo Hosono3,4 and Kunihito Koumoto1,2, IEEE 168 ~ 2005.
[19] Hiroaki Muta, Ken Kurosaki, Shinsuke Yamanaka, Journal of Alloys and Compounds 392 (2005) 306 ~ 309.
[20] O. A. Marina, N. L. Canfield, J. W. Stevenson, Solid State Ionics 149 (2002) 21-28.
[21] S. Hashimoto, F. W. Poulsen, M. Mogensen, Journal of Alloys and Compounds 397 (2006) 245 ~ 249.
[22]美國國家標準和技術院(National Institute for Standards and Technology, NIST) [23]陳徽中 ” 形狀記憶合金Ni2+xMn1-xGa之熱電傳輸性質研究 ”,東華大學碩士論文,2005 [24]李岳勳, ” 異價添加劑對8YSZ離子導體與SrTiO3半導體其晶體結構與導電性質之影響 ”,成功大學碩士論文, 2000.
[25] Y. Tokura, Y. Taguchi, Y. Fujishima, and T. Arima, Phys. Rev. Letts. 70, 2126-2129 ~ 1993.