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1. Highlights in 2007

(1) Development of lead free piezoelectric material

Novel type of phase boundary in lead-free-free materials is discovered. This can be expanding to the large number of compounds. Electrical properties of these are under investigation.

(2) Growth of PZT single crystal films

Unipolar-axis-oriented tetragonal PZT thick films up to 3 μm were successfully grown using novel substrates, even though the previous film thickness was limited below 100 nm. This novel substrate can be applicable to the other materials growth.

(3) Film growth of palaelectric tunable dielectrics

Epitaxial film growth of paraelectric materials with low loss was successfully grown on the bottom electrode having same crystal structure and their electrical property was investigated.

2. Articles

(2-1) Original articles

1. "Fabrication of ZnO Microstructures by Anisotropic Wet-Chemical Etching",
   Naoki Ohashi, Kenji Takahashi, Shunichi Hishita, Isao Sakaguchi, Hiroshi Funakubo and Hajime Haneda,
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2. "Single-phase $Pb(Zn_{1/3}Nb_{2/3})O_3$ thin .films grown by metalorganic chemical vapor deposition: Effects of growth sequence and substrates", Ken Nishida, Shintaro Yokoyama, Satoshi Okamoto, Keisuke Saito, Hiroshi Uchida, Seiichiro Koda, Takashi Katoda and Hiroshi Funakubo,
   J. Crystal Growth, 298 (2007) 495-499.
3. "(111)-Oriented $SrRuO_3$/Pt Bottom Electrode for Reproducible Preparation of Metal Organic Chemical Vapor Deposited $Pb(Zr, Ti)O_3$ Films for High Density Ferroelectric Random Access Memories",
   Nicolas Menou, Hiroki Kuwabara and Hiroshi Funakubo,
   IEICE Technical Report, 106 (593), 2007, SDM2006-258 (2007-03), 21-26.
4. "Probing intrinsic polarization properties in bismuth-layered ferroelectric films",
   Takayuki Watanabe, Hiroshi Funakubo, Minoru Osada, Hiroshi Uchida, Isao Okada, Brian J.

Rodriguez and Alexei Gruverman,
Appl. Phys. Lett., 90, (2007)112914-1-3.

5. "Domain structures in highly (100)-oriented epitaxial $Pb(Zr_{0.35},Ti_{0.65})O_3$ thin films",
Yong Kwan Kim, Hitoshi Morioka, and Hiroshi Funakubo,
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6. "Crystal Growth of β-$FeSi_2$ Thin Film on (100), (110) and (111) Plane of Si and Yittria-Stabilized Zirconia Substrates",
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8. "Low-Temperature Preparation of Metallic Ruthenium Films by MOCVD Using Bis(2,4-dimethylpentadienyl)ruthenium",
Kazuhisa Kawano, Hiroaki Kosuge, Noriaki Oshima and Hiroshi Funakubo,
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9. "Characterization of zinc-modified lithium tantalate thin films fabricated by chemical solution deposition method",
Hiroshi Uchida, Katsumi Onofuji, Hiroshi Funakubo and Seiichiro Koda,
J Sol-Gel Sci Techn, 42 (2007) 265–269.
10. "Impact of (111)-Oriented $SrRuO_3$/Pt Tailored Electrode for Highly Reproducible Preparation of Metal Organic Chemical Vapour Deposited $Pb(Zr,Ti)O_3$ Films for High Density Ferroelectric Random Access Memory Applications",
Nicolas Menou, Hiroki Kuwabara and Hiroshi Funakubo,
Jpn. J. Appl. Phys., 46(4B) (2007) pp.2139-2142.
11. "La Content Dependence of Piezoelectric Properties of Polycrystalline (Pb, $La(Zr_{0.65}, Ti_{0.35})O_3$ Films",
H.Shima, H. Naganuma, T. Iijima, H. Funakubo and S.Okamura,
Trans. Mater. Res. Jpn, 32[1] (2007) pp.79-82.
12. "Crystal structure and microstructure of epitaxial $Pb(Zr,Ti)O_3$ films consisting of mixed phases with tetragonal and rhombohedral symmetries grown on $(100)_c SrRuO_3$//$(100)SrTiO_3$ substrate by metalorganic chemical vapor deposition",
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J. Mater. Res., 22(6) (2007), pp.1551-1557.

13. "Strain and in-plane orientation effects on the ferroelectricity of (111)-oriented tetragonal $Pb(Zr_{0.35}Ti_{0.65})O_3$ thin films prepared by metal organic chemical vapor deposition",
Hiroki Kuwabara, Nicolas Menou and Hiroshi Funakubo,
Appl. Phys. Lett., 90, (2007) 222901-1-3.

14. "(111)-textured Mn-substituted $BiFeO_3$ thin films on $SrRuO_3$ /Pt/Ti/SiO_2/Si structures",
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Appl. Phys. Lett., 90 (2007) 242914-1-3.

15. "Enhancement of field-induced strain by La substitution in epitaxial $Pb(Zr,Ti)O_3$ films grown by metal organic chemical vapor deposition",
Ken Nishida, Yoshihisa Honda, Shintaro Yokoyama, Hiroshi Funakubo, Takashi Yamamoto, Keisuke Saito and Takashi Katoda,
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16. "Oxygen Content and Magnetic Properties of $SrRuO_{3-}$ Thin Films",
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19. "Effect of source materials on film thickness and compositional uniformity of MOCVD-$P(Zr,Ti)O_3$ films",
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20. "Effect of Oxygen Annealing on Ferroelectricity of $BiFeO_3$ Thin Films Formed by Pulsed Laser Deposition",
Hyun-young Go, Naoki Wakiya, Hiroshi Funakubo, Keisuke Satoh, Masao Kondo, Jeffrey S. Cross, Kenji Maruyama, Nobuyasu Mizutani, and Kazuo Shinozaki,
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21. "β-$FeSi_2$ growth on Cu-mediated Si substrate and enhancement of photoluminescence",

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22. "1.54 μm photoluminescence from β-$FeSi_2$ as-deposited film",
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23. "Satellite peaks amplified by modulation in bismuth cuprate thin film",
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27. "RF Magnetron Sputtering Growth of Epitaxial $SrRuO_3$ Films with High Conductivity",
Takafumi Kamo, Ken Nishida, Kensuke Akiyama, Joe Sakai, Takashi Katoda and Hiroshi Funakubo,
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31. “Morphology of sol–gel produced composite films for optical oxygen sensors”,
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33. “Cubic-on-cubic growth of a MgO(001) thin film prepared on Si(001) substrate at low ambient pressure by the sputtering method”,
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Satoru Kaneko, Kensuke Akiyama, Masahiko Mitsuhashi, Takeshi Ito, Masao Kumagai, Hiroshi Funakubo and Mamoru Yoshimoto,
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35. “Epitaxial Growth of Ferromagnetic Iron Silicide Thin Films on Silicon with Yttria-Stabilized Zirconia Buffer Layer”,
Kensuke Akiyama, Satoru Kaneko, Teiko Kadowaki, Yasuo Hirabayashi and Hiroshi Funakubo,
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（2-2）Comment

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2 “Importance of in situ Monitoring in MOCVD Process and Future Prospects”,
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3 “Thickness-degradation-free Dielectric Thin Films”,
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“Spring-8 Research Frontiers 2006”, (2007) pp.87-88.

4 “Development of intefe of Oxide －From the Practical Application point of view－”, (in Japanese)
Hiroshi Funakubo, Osami Sakata, Nobuyasu Mizutani, Seramics data book 2007, 35(89) pp.47-52.

① “Nanostructural Characterization of Surfaces, Interfaces, and thin films using X-ray Reciprocal-Lattice Space Imaging”,
Osami Sakata, Mamoru Yoshimoto, Kazushi Miki, Masasshi Nakamura,
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（2-3）・Book

1. ”MOCVD method”,
Hiroshi Funakubo, and Shintaro Yausi,
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Chapter2.6, (2007) pp.168-178.

3.Invited presentation in International/domestic conference

(3-1) Invternational conference

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3) H. Funakubo, S. Okaura, H. Uchida, S. Koda, M. Osada, and K. Nishida,
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4) Hiroshi Funakubo; Shintaro Yokoyama; Satoshi Okamoto; Keisuke Saito; Takashi Iijima; Ken Nishida; Takashi Katoda; Joe Sakai; Takashi Yamamoto; and Hirotake Okino; "Materials Design for Piezoelectric Thick Films from Study on MOCVDGrown Epitaxial Films", TMS 2008 Annual Meeting & Exhibition, New Orleans, Louisiana, U.S.A., Mar. 9-13, 2008, p.223,

(3-2) Domestic conference

Total 3

4. Others

(4-1) Petaent

Total 12

(4-2) Award

Total 3

(4-3) Remarks

Tpoics presentation in Annual Meeting of Japan Ceramic Society
1 C31L "Growth of Perfectly Polar-axis Oriented Tetragonal PZT Thick Films"
Hiroshi Funakubo, Takashi Fujisawa, Hiroshi Nakaki, Rikyu Ikariyama, Keisuke Saito, and Hitoshi Morioka