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1. Main Research Results

1) Discovery of Iron oxypnictide high temperature superconductors

We reported a new class of superconductor LaFeAsO:F in JACS on Feb 23 in JACS, followed by Tc-increase to 43K under a high pressure of 4GPa (Nature). This discovery disputed a widely believed thought , “ Iron is the most harmful element for emergence of superconductivity”. The resulting Tc reached the highest value except high temperature cuprates exceeding the Tc of MgB₂.

2) Realization of P-channel oxide TFT

Research on oxide-TFTs is now booming toward the application to the back plane of next generation flat panel displays. However, no p-channel TFTs had been realized although more than 10 p-type oxide semiconductors were reported to date. We have realized p-channel oxide TFTs with field effect mobility of 1.4cm²(Vs)⁻¹ using SnO as the active layer. This is a mile-stone-success in oxide electronics, providing a platform to apply the oxide TFTs to logic ICs by fabrication of C-MOS.

2. List of publication (original article, comment/book)

1) Original Paper

- 1) C. J. Zhang, H. Oyanagi, Z. H. Sun, Y. Kamihara, and H. Hosono: Low-temperature lattice structure anomaly in the LaFeAsO_{0.93}F_{0.07} superconductor by x-ray absorption spectroscopy: Evidence for a strong electron-phonon interaction; *Phys. Rev. B*, **78**, 214513, (2008).
- 2) Kosuke Matsuzaki, Kenji Nomura, Hiroshi Yanagi, Toshio Kamiya, Masahiro Hirano, and Hideo Hosono: Epitaxial growth of high mobility Cu₂O thin films and application to p-channel thin film transistor; *Appl. Phys. Lett.*, **93**, 202107-1-3, (2008).
- 3) Hidenori Hiramatsu, Ikue Koizumi, Ki-Beom Kim, Hiroshi Yanagi, Toshio Kamiya, Masahiro Hirano, Noriaki Matsunami, and Hideo Hosono: Characterization of copper selenide thin film hole-injection layers deposited at room temperature for use with p-type organic semiconductors; *J. Appl. Phys.*, **104**, 113723, (2008).
- 4) Hironari OKADA, Yuki TAKAHASHI, Kazumi IGAWA, Kazunobu ARII, Hiroki TAKAHASHI, Takumi WATANABE, Hiroshi YANAGI, Yoichi KAMIHARA, Toshio KAMIYA, Masahiro HIRANO, Hideo HOSONO, Satoshi NAKANO, Takumi KIKEGAWA: Pressure effects on superconducting and structural properties for nickel-based superconductors LaNiXO (X = P and As); *J. Phys. Soc. Jpn. Suppl. C*, **77**, 119-120, (2008).
- 5) Peter V. Sushko, Alexander L. Shluger, Masahiro Hirano, and Hideo Hosono: Mechanism of phase transitions and electronic density of states in LaFeAsO_{1-x}F_x and SmFeAsO_{1-x}F_x from ab initio density functional calculations; *PHYSICAL REVIEW B*, **78**, 172508, (2008)
- 6) Koichi Ichimura, Junya Ishioka, Toru Kurosawa, Katsuhiko Inagaki, Migaku Oda, Satoshi Tanda, Hiroki Takahashi, Hironari Okada, Yoichi Kamihara, Masahiro Hirano, and Hideo Hosono:

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- 7) Yutaka Shinoda, Sung-Wng Kim, Fumihiro Wakai, and Hideo Hosono: Plasticity of Fe-Oxypnictides Superconductor; *J. Phys. Soc. Jpn. Suppl. C*, **77**, 125-126, (2008).
 - 8) S. Kitao, Y. Kobayashi, S. Higashitaniguchi, M. Kurokuzu, M. Saito, Y. Kamihara, M. Hirano, T. Mitsui, H. Hosono, and M. Seto: Spin Ordering in LaFeAsO and Its Suppression in F-Doped Superconductors $\text{LaFeAsO}_{1-x}\text{F}_x$ Probed by Mössbauer Spectroscopy; *J. Phys. Soc. Jpn. Suppl. C*, **77**, 121-122, (2008).
 - 9) Walid Malaeb, Teppei Yoshida, Takashi Kataoka, Atsushi Fujimori, Masato Kubota, Kanta Ono, Hidetomo Usui, Kazuhiko Kuroki, Ryotaro Arita, Hideo Aoki, Yoichi Kamihara, Masahiro Hirano, and Hideo Hosono: Photoemission Study of the Electronic Structure of $\text{LaFeAsO}_{1-x}\text{F}_x$ and $\text{LaFePO}_{1-x}\text{F}_x$; *J. Phys. Soc. Jpn. Suppl. C*, **77**, 69-71, (2008).
 - 10) T. Sato, K. Nakayama, Y. Sekiba, T. Arakane, K. Terashima, S. Souma, T. Takahashi, Y. Kamihara, M. Hirano, and H. Hosono: Doping Dependence of Pseudogap in $\text{LaFeAsO}_{1-x}\text{F}_x$; *J. Phys. Soc. Jpn. Suppl. C*, **77**, 65-68, (2008).
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 - 13) Sung Wng Kim, Yoichi Kamihara, Seok-Gyu Yoon, Hyuk-Su Han, Takatoshi Nomura Satoru Matsuiishi, Koichi Nakao, Keiichi Tanabe, Masahiro Hirano, and Hideo Hosono, Preparation of Fe-Oxypnictides Superconductors: Solid-State Sintering, High Pressure Synthesis and Flux Method, *J. Phys. Soc. Jpn. Suppl. C*, **77**, 23-26, (2008).
 - 14) Hideo Hosono: Layered Iron Pnictide Superconductors: Discovery and Current Status; *J. Phys. Soc. Jpn. Suppl. C*, **77**, 1-8, (2008).
 - 15) Hiroki TAKAHASHI, Hironari OKADA, Kazumi IGAWA, Kazunobu ARII, Yoichi KAMIHARA, Satoru MATSUIISHI, Masahiro HIRANO, Hideo HOSONO, Kazuyuki MATSUBAYASHI and Yoshiya UWATOKO: High-pressure Studies on Superconducting iron-based $\text{LaFeAsO}_{1-x}\text{F}_x$, LaFePO and SrFe_2As_2 ; *J. Phys. Soc. Jpn. Suppl. C*, **77**, 78-83, (2008).
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 - 24) Toshio Kamiya and Masashi Kawasaki: ZnO-Based Semiconductors as Building Blocks for Active Devices; *MRS Bulletin*, **33**, 1061-1066, (2008).
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 - 26) Yoichi Kamihara, Hidenori Hiramatsu, Masahiro Hirano, Hiroshi Yanagi, Toshio Kamiya, and Hideo Hosono: Electronic and magnetic properties of layered LnFePO ($\text{Ln}=\text{La}$ and Ce); *Journal of Physics and Chemistry of Solids*, **69**, 2916-2918, (2008).
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- 30) Soshi TAKESHITA, Ryosuke KADONO, Masatoshi HIRAISHI, Masanori MIYAZAKI, Akihiro KODA, Yoichi KAMIHARA, and Hideo HOSONO, Coexistence of Superconductivity and Magnetism in LaFeAs(O_{0.94}F_{0.06}) Probed by Muon Spin Relaxation, *Journal of the Physical Society of Japan* Vol. **77**, No. 10, 103703-1-4 (2008)
- 31) Koichi Kajihara, Masahiro Hirano, Linards Skuja and Hideo Hosono: Intrinsic defect formation in amorphous SiO₂ by electronic excitation: Bond dissociation versus Frenkel mechanisms; *Phys. Rev. B*, **78**, 094201, (2008)
- 32) Hidenori Hiramatsu, Takayoshi Katase, Toshio Kamiya, Masahiro Hirano, and Hideo Hosono: Superconductivity in Epitaxial Thin Films of Co-Doped SrFe₂As₂ with Bilayered FeAs Structures and their Magnetic Anisotropy; *Appl. Phys. Express*, **1**, 101702, (2008).
- 33) Yoshimitsu Kohama, Yoichi Kamihara, Hitoshi Kawaji, Tooru Atake, Masahiro HIRANO, and Hideo HOSONO: Possible Unconventional Superconductivity in Layered Compound LaFePO: Study of Heat Capacity; *J. Phys. Soc. Jpn.*, **77**, 094715, (2008).
- 34) Walid Malaeb, Teppei Yoshida, Takashi Kataoak, Atsushi Fujimori, Masato Kubota, Kanta Ono, Hidetomo Usui, Kazuhiko Kuroki, Ryotaro Arita, Hideo Aoki, Yoichi Kamihara, Masahiro Hirano, and Hideo Hosono: Electronic Structure and Electron Correlation in LaFeAsO_{1-x}F_x and LaFePO_{1-x}F_x; *J. Phys. Soc. Jpn.*, **77**, 093714, (2008).
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- 36) S.W. Kim, M. Miyakawa, M. Hirano, Y. Kohama, H. Kawaji, T. Atake, H. Ikegami, K. Kono, and H. Hosono: Superconducting Transition in Electron-doped 12CaO·7Al₂O₃; *Mater. Trans.*, **49**, 1748-1752, (2008).
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 - 48) Yusuke Nakai, Kenji Ishida, Yoichi Kamihara, Masahiro Hirano, and Hideo Hosono ; Evolution from Itinerant Antiferromagnet to Unconventional Superconductor with Fluorine Doping in $\text{LaFeAs}(\text{O}_{1-x}\text{F}_x)$ Revealed by ^{75}As and ^{139}La Nuclear Magnetic Resonance.: *J. Phys. Soc. Jpn.*, **77** (2008) 073701.
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- 59) Kachirayil J. Saji, Madambi K. Jayaraj, Kenji Nomura, Toshio Kamiya and Hideo Hosono: Optical and Carrier Transport Properties of Cosputtered Zn–In–Sn–O Films and Their Applications to TFTs; *J. Electrochem. Soc.*, **155**, H390-H395, (2008).
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- 62) Hideo Hosono, Sung Wang Kim, Masashi Miyakawa, Satoru Matsuishi, Toshio Kamiya: Thin film and bulk fabrication of room-temperature-stable electride C12A7:e⁻ utilizing reduced amorphous 12CaO·7Al₂O₃ (C12A7); *J. Non-Cryst. Sol.*, **354**, 2772-2776, (2008).
- 63) Hideo Hosono, Kenji Nomura, Youichi Ogo, Tomoya Uruga and Toshio Kamiya: Factors controlling electron transport properties in transparent amorphous oxide semiconductors; *J. Non-Cryst. Sol.*, **354**, 2796-2800, (2008).
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- 70) Hideya Kumomi, Kenji Nomura, Toshio Kamiya, and Hideo Hosono: Amorphous oxide channel TFTs; *Thin Solid Films*, **516**, 1516, (2008).
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- 74) Toshio Kamiya, Kenji Nomura, Masahiro Hirano, and Hideo Hosono: Electronic structure of oxygen deficient amorphous oxide semiconductr $a\text{-InGaZnO}_{4-x}$: Optical analysis and first-principle calculations; *physica status solidi (c)*, **5**, 3098-3100, (2008).
- 75) Koichi Kajihara, Taisuke Miura, Hayato Kamioka, Akira Aiba, Motomo Uramoto, Yukihiro Morimoto, Masahiro Hirano, Linards Skuja, Hideo Hosono: Diffusion and reactions of interstitial oxygen species in amorphous SiO_2 : A review; *journal of Non-Crystalline Solids*, **354**, 224-232, (2008).

2) Review & Book

- a) Hideo Hosono, David Ginley, Yuzo Shigesato and Toshio Kamiya: Transparent Conductive Oxide Thin Films 2007; *Thin Solid Films*, **516**, 5749-5927, (2008).
- b) E. Fortunate, H. Hosono, C. Granqvist, J. Wager (edited), Advances in Transparent Electronics: From materials to devices, *Thin Solid Films*, **516**, 1313-1644, (2008)
- c) H. Hosono, Y. Matsu moto, T. Akatsu, N. Matsushita: Proc. STAC-1 and JTMC; *Materials Science & Eng. B*, **148**, 1-277, (2008)

3. Invited/Plenary Talks in Conference

1) International Conference or Workshop

- (1) H.Hosono: Electro-active Functionality in Layered Oxy-compounds with ZrSiCuAs-type Structure (Plenary Lecture); *2nd International Symposium on Transparent Conductive Oxides (ISTCO, Crete, Greece, Oct. 23, 2008)*, (2008).
- (2) H.Hosono: New Iron(Nickel)-based Superconductors with Layered Structure: Discovery and Recent Advances (Plenary Talk); *Beijing International Workshop on Fe(Ni)-based High Temperature Superconductors (Oct. 17, 2008, Beijing, China)*, (2008).
- (3) H. Hosono: Transition metal oxynicides as a platform of high T_c superconductors; *The 25th International Conference on Low Temperature Physics (Plenary Talk) (Amsterdam, August 8, 2008)*, **77**, 073701, (2008).
- (4) H. Hosono: RT stable Electride C₁₂A₇:e⁻: synthesis and device application; (Plenary Talk) *5th International Vacuum Electronics Conference, Queen Mary College (UK, August 5, 2008)*, **77**, 073701, (2008).
- (5) Hideo Hosono: Transparent Oxide Semiconductors for Applications in Next Generation Displays; *7th International Conference on Coating on Glass and Plastics (Plenary Talk, Eindhoven, The Netherlands, June 16)*, (2008).
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2) Domestic Conferences

Domestic Invited and Special Lectures: 46 Lectures

4. Patent

7 applications

5. Others

1) International Collaboration

Some researches are collaborated with several universities and institutions; such as University of Latvia (Latvia), UCL(UK), Los Aramos National Lab.(US), Dresden Superconductivity Center(Germany)

2) Others

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