

ICSS Silicide 2014 PROGRAM

International Conference

July 19

13:00→ 13:10 Opening

Session I: Semiconducting β -FeSi₂

13:10—13:50 [19-PM-I-1] *Invited*

“Present state of research on photodiodes comprising iron disilicides and problems awaiting solution”

Tsuyoshi Yoshitake

Department of Appl. Sci. for Electr. and Mat., Kyushu University, Japan

13:50—14:30 [19-PM-I-2] *Invited*

“Electrical transport properties of β -FeSi₂ epitaxial and polycrystalline films with low residual carrier density”

Yoshikazu Terai

Graduate School of Science and Engineering, Kagoshima University, Japan

14:30—14:50 [19-PM-I-3]

“Photoluminescence properties of β -FeSi₂ on treated Si surface by metals”

Kensuke Akiyama¹ and Hiroshi Funakubo²

¹Kanagawa Industrial Technology Center and ²Tokyo Institute of Technology, Japan

Break 14:50—15:10

Session II: New formation technique for Si-based materials

15:10—15:50 [19-PM-I-4] *Invited*

“Fabrication of Si nanoparticles from Si swarf and their application”

Hikaru Kobayashi, Masanori Maeda, Katsuya Kimura, Yuki Kobayashi, Kentaro Imamura,
and Taketoshi Matsumoto

The Institute of Scientific and Industrial Research, Osaka University, Japan

15:50—16:10 [19-PM-I-5]

“Synthesis of Mn silicide-based composite fine particles by solid-state exfoliation reaction and photocurrent response under visible light irradiation”

Haruo Imagawa, Song-Yul Oh, and Hiroshi Itahara

Toyota Central Research & Development Labs., Inc., Japan

16:10—16:30 [19-PM-I-6]

“Realization of single-phase BaSi₂ films by vacuum evaporation with appropriate optical properties for solar cell applications”

Kosuke O. Hara,^{1,2} Yoshihiko Nakagawa,¹ Takashi Suemasu,^{2,3} and Noritaka Usami^{1,2}

¹Graduate School of Engineering, Nagoya University, ²CREST-JST, ³University of Tsukuba, Japan

16:30—18:00 Poster Session I (Light meals & Drinks, 1.5h)

July 20

Session III: Semiconducting Mg₂Si: thermoelectric and optical properties

8:30—9:10 [20-AM-II-1] *Invited*

“Valence electron control on the incommensurate higher manganese silicides”

Yuzuru Miyazaki¹, Yuta Kikuchi¹, Kei Hayashi¹, and Kunio Yubuta²

¹*Department of Applied Physics, Tohoku University, Japan*

²*Institute for Materials Research, Tohoku University, Japan*

9:10—9:30 [20-AM-II-2]

“Mg₂Si thermoelectric device fabrication with reused-silicon”

Shigeyuki Nakamura,¹ Yoshihisa Mori,² and Ken'ichi Takarabe²

¹*Tsuyama National College*, ²*Okayama University of Science, Japan*

9:10—9:30 [20-AM-II-3]

“Mechanical properties of Mg₂Si with metallic binders”

Masashi Ishikawa, Takashi Nakamura, Yasuo Kogo, Tsutomu Iida, and Keishi Nishio

Tokyo University of Science, Japan

9:30—10:10 [20-AM-II-4] *Invited*

“Semiconducting Mg₂Sn and Mg₂Sn_xSi_{1-x} films on Si(111) substrates: formation and properties”

Nikolay G. Galkin, Konstantin N. Galkin, Dimitrii L. Goroshko, Igor M. Chernev, and

Alexander V. Shevlyagin

Institute of Automation and Control Processes of Far Eastern Branch of RAS, Russia

10:10—10:30 [20-AM-II-5]

“Solid phase growth of Mg₂Si thin films on Si(111) and their optical, structural and electrical properties”

Tetsuya Hashimoto and Hiroshi Katsumata

Meiji University, Japan

10:30—12:00 Poster Session II

Lunch Break 12:00—13:00

International Summer School

Session I: Invited Lecture 1

13:00—14:00 [20-PM-III-1] *Plenary lecture*

“Silicides: Materials for thermoelectric energy conversion”

Mikhail I. Fedorov^{1,2} and Grigory N. Isachenko^{1,2}

¹*Ioffe Physical-Technical Institute of Russian Academy of Sciences, Saint-Petersburg, Russia*

²*National Research University of Information Technologies, Mechanics and Optics, Saint-Petersburg, Russia*

14:00—15:00 [20-PM-III-2] *Plenary lecture*

“Metal silicide nanowires”

Lih J. Chen¹ and Wen-Wei Wu²

¹*Department of Materials Science and Engineering, National Tsing Hua University, Hsinchu, Taiwan*

²*Department of Materials Science and Engineering, National Chiao Tung University, Hsinchu, Taiwan*

Break 15:00—15:20

15:20—16:20 [20-PM-III-3] *Invited lecture*

“Transport properties of β -FeSi₂”

Ernest Arushanov¹ and Konstantin G. Lisunov²

¹*Institute of Applied Physics, Academy of Sciences of Moldova, Kishinev, Moldova*

²*Lappeenranta University of Technology, Lappeenranta, Finland*

16:20—17:20 [20-PM-III-4] *Invited lecture*

“Basics of optical properties of semiconductors and optoelectronic devices”

Kevin Homewood

University of Surrey, Surrey, UK

Conference Banquet 17:45—19:30

July 21

Session II: Invited Lecture 2

9:00—10:00 [21-AM-VI-1] *Invited lecture*

“Electronic and optical properties of semiconducting silicides: theoretical predictions”

Dmitri B. Migas

Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus

10:00—11:00 [21-AM-VI-2] *Invited lecture*

“Light emission from β -FeSi₂”

Yoshihito Maeda^{1,2}

¹*Kyushu Institute of Technology, Fukuoka, Japan*

²*Advanced Science Research Center, Japan Atomic Energy Agency, Japan*

11:00—11:20 Break

11:20—11:50 Closing

Session III: Thermoelectric Devices : Theory and Fabrication

13 :30--

Poster Session I

[19-P1]

“Photoluminescence enhancement of β -FeSi₂ nanocrystals controlled by holes transport in Cu-doped n-type Si substrates”

Takahide Tatsumi¹, Hiroyuki Kobayashi¹, Kazumasa Narumi², Seiji Sakai², and Yoshihito Maeda^{1,2}

¹*Department of Computer Science and Electronics, Kyushu Institute of Technology, Iizuka, Fukuoka 820-8502, Japan*

²*Advanced Science Research Center, Japan Atomic Energy Agency, Tokai, Ibaraki 319-1110, Japan*

[19-P2]

“Enhancement of photoluminescence from Cu-doped nano-composite phase with β -FeSi₂ nanocrystals embedded in Si”

Tomoaki Hirata, Takahide Tatsumi, Hiroyuki Kobayashi, and Yoshihito Maeda

Department of Computer Science and Electronics, Kyushu Institute of Technology, Iizuka, Fukuoka 820-8502, Japan

[19-P3]

“Super-enhancement of 1.5 μ m emission from erbium co-implanted with oxygen in silicon-on-insulator”

M. A. Lourenço, Milan M. Milosevic, Arnaud Gorin, R. M. Gwilliam, and K. P. Homewood

Advanced Technology Institute, Faculty of Engineering and Physical Sciences, University of Surrey, Guildford, Surrey, GU2 7XH, UK

[19-P4]

“Photoluminescence property of nano-composite phases of β -FeSi₂ nanocrystals embedded in SiO₂”

Tatsuya Nakamura, Takahide Tatsumi, Kosuke Morita, Hiroyuki Kobayashi, and Yoshihito Maeda

Department of Computer Science and Electronics, Kyushu Institute of Technology, Iizuka, Fukuoka 820-8502, Japan

[19-P5]

“FTIR Analysis of oxidation behaviors of nano-composite phases with β -FeSi₂ nanocrystals and Si”

Kosuke Morita, Tatsuya Nakamura, Hiroyuki Kobayashi, Takahide Tatsumi, and Yoshihito Maeda

Department of Computer Science and Electronics, Kyushu Institute of Technology, Fukuoka 820-8502, Japan

[19-P6]

“Extended X-ray absorption fine-structure study of carbon-doped β -FeSi₂”

Tarek M. Mostafa¹, Mahmoud Shaban², Motoki Takahara¹, Suguru Funashiki¹, Aki Tominaga¹, Toshihiro Okajima³, and Tsuyoshi Yoshitake¹

¹*Department of Applied Science for Electronics and Materials, Kyushu University, Fukuoka 816-8580, Japan*

²*Department of Electr. Eng., Aswan Fac. Of Eng., Aswan Univ., Aswan 81542, Egypt*

³*Kyushu Synchrotron Light Research Center, Saga 841-0005, Japan*

[19-P7]

“Electric properties of carbon-doped n-type β -FeSi₂/p-type Si heterojunction diodes”

Motoki Takahara¹, Suguru Funasaki¹, Tarek M. Mostafa¹, Mahmoud Shaba², Nathaporn Promros³, and Tsuyoshi Yoshitake¹

¹*Dept. of Appl. Sci. for Electr. and Mat., Kyushu Univ., 6-1 Kasuga, Fukuoka 816-8580, Japan*

²*Dept. of Electr. Eng., Aswan Faculty of Eng., Aswan Univ., Aswan 81542, Egypt*

³*Dept. of Phys., Fac. of Sci., King Mongkut's Inst. of Tech. Ladkrabang, Chalongkrung Road, Bangkok 10520, Thailand*

[19-P8]

“Growth of β -FeSi₂ polycrystalline thin films with low residual carrier density by magnetron sputtering”

Tetsu Hattori, Takahiko Higashi, Hiroaki Tsukamoto, Haruki Yamaguchi, and Yoshikazu Terai
Graduate School of Science and Engineering, Kagoshima University, Kagoshima 890-0065, Japan

[19-P9]

“Investigation of surface Fermi level in β -FeSi₂ epitaxial films by Franz-Keldysh oscillations”

Hiroaki Tsukamoto, Haruki Yamaguchi, Tetsu Hattori, Takahiko Higashi, and Yoshikazu Terai
Graduate School of Science and Engineering, Kagoshima University, Kagoshima 890-0065, Japan

[19-P10]

“Effect of β -FeSi₂/Si heterointerface on electrical properties in β -FeSi₂ polycrystalline thin films grown by magnetron sputtering”

Takahiko Higashi, Hattori Tetsu, Hiroaki Tsukamoto, Haruki Yamaguchi, and Yoshikazu Terai
Graduate School of Science and Engineering, Kagoshima University, Kagoshima 890-0065, Japan

[19-P11]

“Temperature dependence of Raman spectra in β -FeSi₂ epitaxial films”

Haruki Yamaguchi, Hiroaki Tsukamoto, Tetsu Hattori, Takahiko Higashi, and Yoshikazu Terai
Graduate School of Science and Engineering, Kagoshima University, Kagoshima 890-0065, Japan

[19-P12]

“Characterization of band structure of K₈Ga₈Si₃₈ clathrate by optical measurement”

Masaru Iioka¹, Haruhiko Uono², Motoharu Imai³, and Masato Aoki³

¹*Ibaraki University, Graduate school of Science and Engineering, Hitachi, Ibaraki 316-8511, Japan*

²*National Institute for Materials Science, 1-2-1 Sengen, Tsukuba, Ibaraki 305-0047, Japan*

³*Gifu University, Faculty of Engineering, 1-1 Yanagido, Gifu, Gifu 501-1193, Japan*

[19-P13]

“Microstructures and photoelectric properties of spherical silicon solar cells”

Takeo Oku¹, Yuuki Yamamoto¹, Tsuyoshi Akiyama¹, Youichi Kanamori²,
Mikio Murozono², Masahiro Yamada², Sakiko Fukunishi³, and Kazufumi Kohno³

¹*Department of Materials Science, The University of Shiga Prefecture, Hikone, Shiga 522-8533, Japan*

²*Clean Venture 21 Corporation, Kyoto 601-8121, Japan*

²*Osaka Gas Co., Ltd., 6-19-9 Torishima, Konohana-ku, Osaka 554-0051, Japan*

³*Osaka Gas Chemicals Co., Ltd., 5-11-61 Torishima, Konohana-ku, Osaka 554-0051, Japan*

[19-P14]

“Fabrication and characterization of silicon naphthalocyanine and fullerene-based organic solar cells with inverted structures”

Haruto Maruhashi, Atsushi Suzuki, Tsuyoshi Akiyama, and Takeo Oku

Department of Materials Science, The University of Shiga Prefecture, Hikone, Shiga 522-8533, Japan

[19-P15]

“Effects of triphenylborane Addition to decaphenylcyclopentasilane thin films”

Takeo Oku¹, Naoki Hibi¹, Atsushi Suzuki¹, Tsuyoshi Akiyama¹, Masahiro Yamada², Sakiko Fukunishi³, and Kazufumi Kohno³

¹*Department of Materials Science, The University of Shiga Prefecture,
Hassaka 2500, Hikone, Shiga 522-8533, Japan*

²*Osaka Gas Co., Ltd., 6-19-9 Torishima, Konohana-ku, Osaka 554-0051, Japan*

³*Osaka Gas Chemicals Co., Ltd., 5-11-61 Torishima, Konohana-ku, Osaka 554-0051, Japan*

[19-P16]

“Investigation on the *J-V* characteristics of BaSi₂ Schottky junctions with different metal electrodes”

Weijie Du¹, Masakazu Baba¹, Ryouta Takabe¹, Ning Zhang¹, Kaoru Toko¹,
Noritaka Usami^{2,3}, and Takashi Suemasu^{1,2}

¹*Institute of Applied Physics, University of Tsukuba, Tsukuba, Ibaraki 305-8573, Japan*

²*Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan*

³*JST-CREST, Chiyoda-ku, Tokyo 102-0075, Japan*

[19-P17]

“Characterization of defect levels in BaSi₂ epitaxial films on Si(111) by deep level transient spectroscopy”

Hiroki Takeuchi¹, Weijie Du¹, Masakazu Baba¹, Ryota Takabe¹, Kaoru Toko¹, and Takashi Suemasu^{1,2}

¹*University of Tsukuba, Institute of Applied Physics, Tsukuba 305-8573, Japan*

²*JST-CREST, Tokyo 102-0075, Japan*

[19-P18]

“Effect of grain areas on minority-carrier lifetime in undoped n-BaSi₂ on Si(111)”

Ryota Takabe¹, Kosuke O. Hara², Masakazu Baba¹, Weijie Du¹, Naoya Shimada¹, Kaoru Toko¹, Noritaka Usami^{2,3},
and Takashi Suemasu^{1,3}

¹*University of Tsukuba, Institute of Applied Physics, Tsukuba 305-8573, Japan*

²*Nagoya University, Chikusa-ku, Nagoya 464-8603, Japan*

³*JST-CREST, Tokyo 102-0075, Japan*

[19-P19]

“Investigation of surface potential distributions of impurity-doped n-BaSi₂ thin-films by Kelvin probe force microscopy”

Daichi Tsukahara¹, Masakazu Baba¹, Ryota Takabe¹, Kaoru Toko¹, Kosuke O. Hara², Noritaka Usami^{2,3}, Kentaro
Watanabe^{1,4}, Takashi Sekiguchi⁴, and Takashi Suemasu^{1,3}

¹*University of Tsukuba, Institute of Applied Physics, 1-1-1 Tennodai, Tsukuba, Ibaraki 305-8573, Japan*

²*Graduate School of Engineering, Nagoya University, Chikusa-ku, Nagoya 464-8603, Japan*

³*JST-CREST, Tokyo, 102-0075, Japan*

⁴*National Institute for Materials Science, Ibaraki 305-0044, Japan*

[19-P20]

“Crystal growth of undoped and impurity doped BaSi₂ films on poly-crystalline Si”

Masakazu Baba¹, Kosuke O. Hara², Daichi Tsukahara¹, Kaoru Toko¹, Noritaka Usami^{2,3}, and Takashi Suemasu^{1,2}

¹*University of Tsukuba, Institute of Applied Physics, 1-1-1 Tennodai, Tsukuba, Ibaraki 305-8573, Japan*

²*Graduated School of Engineering, Nagoya University, Nagoya 464-8603, Japan*

³*JST-CREST, Chiyoda-ku Tokyo 102-0075, Japan*

[19-P21]

“Syntheses of silicide and silicon based nanostructures using metal chloride sources”

Hirokazu TATSUOKA¹, Hiroaki SUZUKI¹, Wen LI², Junhua Hu², Erchao MENG², and Xiang MENG²

¹*Graduate School of Engineering, Shizuoka University, Hamamatsu 432-8561, Japan*

²*Graduate School of Science and Technology, Shizuoka University, Hamamatsu 432-8011, Japan*

[19-P22]

“Substrate-Source distance dependence of morphological and structural properties of Si nanowires / microrods grown with Au catalyst using MnCl₂ and Si powders”

Hiroaki Suzuki¹, Erchao Meng², Xiang Meng², and Hirokazu Tatsuoka¹

¹*Graduate School of Engineering, Shizuoka University, Hamamatsu, 432-8561, Japan*

²*Graduate School of Science and Technology, Shizuoka University, Hamamatsu, 432-8011, Japan*

[19-P23]

“Shape controlled growth of Si nanowires using MnCl₂ and Si powder source and Au catalyst”

Erchao Meng¹, Xiang Meng¹, Hiroaki Suzuki², and Hirokazu Tatsuoka²

¹*Graduate School of Science and Technology, Shizuoka University, Hamamatsu 432-8011, Japan*

²*Faculty of Engineering, Shizuoka University, 3-5-1 Johoku Hamamatsu 432-8561, Japan*

[19-P24]

“The Laser ablation as a perspective technique for the deposition of metal-silicide nanoparticles in situ embedded in PECVD of Si:H thin films”

The Ha Stuchlikova¹, Radek Fajgar², Martin Kostejn², Vladislav Drinek², Zdenek Remes¹, and Jiri Stuchlik¹

¹*Institute of Physics ASCR, v. v. i., Cukrovarnicka 10/112, 162 00 Praha 6, Czech Republic*

²*Institute of Chemical Process Fundamentals of the ASCR, v. v. i., Rozvojova 135, 165, 02 Praha 6, Czech Republic*

[19-P25]

“Deposition of modified Si:H thin films with embedded silicide nanoparticles formed by the combination of Vacuum Evaporation and Plasma Treatment”

The Ha Stuchlikova, Zdenek Remes, and Jiri Stuchlik

Institute of Physics ASCR, v. v. i., Cukrovarnická 10/112, 162 00 Praha 6, Czech Republic

[19-P26]

“Morphological and structural observation of metal clusters on SrTiO₃ surfaces by STM/TEM combined system”

Miyoko Tanaka

¹*Surface Physics and Structure Unit, National Institute for Materials Science, Tsukuba, Ibaraki 305-0003, Japan*

[19-P27]

“Effect of impurity addition on shape modification of Si nanowires/microrods by using faceted silicide catalysts nucleated in Au-Si catalyst solution”

Hiroaki Suzuki¹, Erchao Meng², Xiang Meng², and Hirokazu Tatsuoka¹

¹*Graduate School of Engineering, Shizuoka University, Hamamatsu, 432-8561, Japan*

²*Graduate School of Science and Technology, Shizuoka University, Hamamatsu, 432-8011, Japan*

[19-P28]

“Removal of Ge islands in Al-induced crystallized Ge thin films on glass substrates by selective etching technique”

Koki Nakazawa, Kaoru Toko, and Takashi Suemasu

University of Tsukuba, Institute of Applied Physics, Tsukuba, Ibaraki 305-8573, Japan

[19-P29]

“Effect of substrate thickness on Al-induced-crystallized Ge thin films on flexible polyimide substrates”

N. Oya¹, K. Toko¹, N. Usami², and T. Suemasu¹

¹*University of Tsukuba, Institute of Applied Physics, Tsukuba, Ibaraki 305-8573, Japan*

²*Nagoya University, Furo-cho, Chikusa-ku, Aichi, 464-8603 Japan*

[19-P30]

“Ion channeling analysis of disordering behavior at Fe₃Si/Si(111) heteroepitaxial interfaces”

Yuki Kawakubo¹, Yuya Noguchi¹, Kazumasa Narumi², Seiji Sakai², and Yoshihito Maeda^{1,2}

¹*Department of Computer Science and Electronics, Kyushu Institute of Technology, Iizuka, Fukuoka 820-8502, Japan*

²*Advanced Science Research Center, Japan Atomic Energy Agency, Tokai, Ibaraki 319-1110, Japan*

[19-P31]

“Magnetoresistance effects in current-perpendicular-to-plane structures based on Fe₃Si/FeSi₂ artificial lattices”

Ken-ichiro Sakai^{1,2}, Yuki Asai¹, Yuta Noda¹, Kaoru Takeda³, and Tsuyoshi Yoshitake¹

¹*Kyushu Univ., Dept. of Appl. Sci. for Electr. and Mat., Kasuga, Fukuoka 816-8580, Japan*

²*Kurume Nat. Coll. of Tech., Dept. of Cont. and Inf. Syst. Eng., Kurume, Fukuoka 830-8555, Japan*

³*Fukuoka Inst. of Tech., Dept. of Electrical Engineering, Fukuoka 811-0295, Japan*

[19-P32]

“Current-induced-magnetization switching at low current densities in current-perpendicular-to-plane structural Fe₃Si/FeSi₂ artificial lattices”

Yuki Asai¹, Ken-ichiro Sakai^{1,2}, Yuta Noda¹, Kaoru Takeda³, and Tsuyoshi Yoshitake¹

¹*Kyushu Univ., Dept. of Appl. Sci. for Electr. and Mat., Kasuga, Fukuoka 816-8580, Japan*

²*Kurume Nat. Coll. of Tech., Dept. of Cont. and Inf. Syst. Eng., Kurume, Fukuoka 830-8555, Japan*

³*Fukuoka Inst. of Tech., Dept. of Electr. Eng., Fukuoka 811-0295, Japan*

[19-P33]

“Temperature-dependent interlayer coupling in Fe₃Si/FeSi₂ artificial lattices”

Ken-ichiro Sakai^{1,2}, Yuki Asai¹, Yuta Noda¹, Hiroyuki Deguchi³, Kaoru Takeda⁴, and Tsuyoshi Yoshitake¹

¹*Kyushu Univ., Dept. of Appl. Sci. for Electr. and Mat., Kasuga, Fukuoka 816-8580, Japan*

²*Kurume Nat. Coll. of Tech., Dept. of Cont. and Inf. Syst. Eng., Kurume, Fukuoka 830-8555, Japan*

³*Kyushu Inst. of Tech., Fac. of Eng., Kitakyushu, Fukuoka 804-8550, Japan*

⁴*Fukuoka Inst. of Tech., Dept. of Electr. Eng., Fukuoka 811-0295, Japan*

[19-P34]

“Formation of spin valve junctions based on Fe₃Si/FeSi₂/Fe₃Si artificial films”

Yuki Asai¹, Ken-ichiro Sakai^{1,2}, Kazuya Ishibashi¹, Yuta Noda¹, Kaoru Takeda³, and Tsuyoshi Yoshitake¹

¹*Kyushu Univ., Dept. of Appl. Sci. for Electr. and Mat., Kasuga, Fukuoka 816-8580, Japan*

²*Kurume Nat. Coll. of Tech., Dept. of Cont. and Inf. Syst. Eng., Kurume, Fukuoka 830-8555, Japan*

³*Fukuoka Inst. of Tech., Dept. of Electr. Eng., Fukuoka 811-0295, Japan*

Poster Session II

[20-P1]

“Bulk crystal growth and characterization of Mg₂Si and MnSi_{1.75-x} for IR detector and thermoelectric applications”

Haruhiko Udonon

Ibaraki University, Ibaraki, Japan

[20-P2]

“Evaluation of Mg₂Si pn-junction depth by sputter etching”

N. Hori¹, S. Hasunuma¹, F. Esaka², and H. Udonon¹

¹*Ibaraki University, 4-12-1 Nakanarusawa, Hitachi, Ibaraki 316-8511, Japan*

²*Japan Atomic Energy Agency (JAEA), Tokai, Ibaraki 319-1195, Japan*

[20-P3]

“Influence of Sb distribution on thermoelectric property in melt-grown Mg₂Si”

Hiroshi Okazaki, Kaoru Kambe, and Haruhiko Udonon

Graduate School of Science and Engineering, Ibaraki University, Ibaraki 316-8511, Japan

[20-P4]

“Effect of Bi and Sb impurity on thermal conductivity in melt grown Mg₂Si”

H. Otake¹, T. Otsubo¹, S. Hasunuma¹, M. Itakura², and H. Udonon¹

¹*Ibaraki University, Graduated school of Science and engineering, 4-12-1 Nakanarusawa, Hitachi, Ibaraki 316-8511, Japan*

²*Kyushyu University, Department of Applied Science for Electronics and Materials, Kasuga, Fukuoka 816-8580, Japan*

[20-P6]

“Fabrication and characterization of Mg₂Si pn-junction photodiode with a ring electrode”

K. Daitoku¹, M. Takezaki¹, S. Tanigawa², D. Tsuya², and H. Udonon¹

¹*Ibaraki University, 4-12-1 Nakanarusawa, Hitachi, Ibaraki 316-8511, Japan*

²*National Institute for Materials Science (NIMS), 1-2-1 Sengen, Tsukuba, Ibaraki 305-0047, Japan*

[20-P7]

“Semiconducting CrSi₂, Mg₂Si and Ca₂Si nanocrystallites for solar cells based on hydrogenated amorphous silicon on glass substrates”

Nikolay G. Galkin¹, Konstantin N. Galkin¹, Igor M. Chernev¹, Radek Fajgar², The Ha Stuchlikova³, Zdenek Remes³, and Jiri Stuchlik³

¹*Institute of Automation and Control Processes of Far Eastern Branch of RAS, Vladivostok, 690041, Radio, 5, Russia*

²*Institute of Chemical Process Fundamentals of the ASCR, v. v. i., Rozvojová 135, 165 02 Praha 6, Czech Republic*

³*Institute of Physics of the ASCR, v. v. i., Cukrovarnická 10/112, 162 00 Praha 6, Czech Republic*

[20-P8]

“Fabrication and evaluation of B-doped p-BaSi₂ films by RF sputtering on glass substrate”

N. A. A. Latiff¹, T. Yoneyama¹, M. Mesuda², H. Kuramochi², K. Toko¹, and T. Suemasu^{1,3}

¹*University of Tsukuba, Institute of Applied Physics, Tsukuba, Ibaraki 305-8573, Japan*

²*Tosoh Corporation, Shunan, Yamaguchi 746-8501, Japan*

³*CREST-JST, Chiyoda, Tokyo 102-0075, Japan*

[20-P9]

“High-pressure synthesis of clathrates in the Na-Al-Si system”

Motoharu Imai¹, Mitsuaki Nishio¹, Takahiro Yamada², and Hisanori Yamane²

¹*National Institute for Materials Science, 1-2-1 Sengen, Tsukuba, Ibaraki 305-0081, Japan*

²*Tohoku University, IMRAM, 2-1-1 Katahira, Aoba-ku, Sendai, Miyagi 980-8577, Japan*

[20-P10]

“Synthesis of $\text{Na}_2\text{Mg}_3\text{X}_2$ (X=Sn, Pb) and $\text{Na}_4\text{Mg}_4\text{Sn}_3$, and their thermoelectric properties”

Takahiro Yamada, Ryo Ishiyama, and Hisanori Yamane

Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, 2-1-1 Katahira, Aoba-ku, Sendai 980-8577, Japan

[20-P11]

“Synthesis and crystallization of Mg_2Si by the liquid encapsulated vertical gradient freezing method”

Reo Nakagawa¹, Hiroshi Katsumata¹, Satoshi Hashimoto², and Shiro Sakuragi²

¹*Department of Electronics and Bioinformatics, Meiji University, Kawasaki 214-8571, Japan*

²*Union Materials Inc., Tone-machi, Kita-souma, Ibaraki 300-1602, Japan*

[20-P12]

“First-principles study on stability of p-type impurity-doped Mg_2Si consisting of Mg defect”

Naomi Hirayama¹, Tsutomu Iida¹, Hiroki Funashima², Shunsuke Morioka¹,

Mariko Sakamoto¹, Keishi Nishio^q, Yasuo Kogo¹, Yoshifumi Takanashi¹, and Noriaki Hamada³

¹*Tokyo University of Science, Katsushika Campus, 6-3-1 Niiyuku, Katsushika, Tokyo 125-8585, Japan*

²*Department of Engineering Science, Graduate School of Osaka University, 1-3 Machikaneyama, Toyonaka, Osaka 560-0043, Japan*

³*Tokyo University of Science, Noda Campus, 2641 Yamazaki, Noda-shi, Chiba 278-8510, Japan*

[20-P13]

“Theoretical analysis of the structure and formation energy of impurity-doped Mg_2Si : Comparison of first-principles codes for material properties”

Naomi Hirayama¹, Tsutomu Iida¹, Hiroki Funashima², Shunsuke Morioka¹, Mariko Sakamoto¹, Keishi Nishio¹, Yasuo Kogo¹, Yoshifumi Takanashi¹, and Noriaki Hamada³

¹*Tokyo University of Science, Katsushika Campus, 6-3-1 Niiyuku, Katsushika, Tokyo 125-8585, Japan*

²*Department of Engineering Science, Graduate School of Osaka University, 1-3 Machikaneyama, Toyonaka, Osaka 560-0043, Japan*

³*Tokyo University of Science, Noda Campus, 2641 Yamazaki, Noda-shi, Chiba 278-8510, Japan*

[20-P14]

“Crystal structures and electrical properties of Mg_2Si epitaxial films prepared by sputtering method”

Shota Ogawa¹, Atsuo Katagiri¹, Masaaki Matsushima¹, Kensuke Akiyama^{1,2}, and Hiroshi Funakubo¹

¹*Department of Innovative and Engineered Materials, Tokyo Institute of Technology*

259 Nagatsuta, Midori-ku, Yokohama 226-8502, Japan

²*Kanagawa Industrial Technology Center, 705-1 Shimoimaizumi, Ebina-shi, Kanagawa 243-0435, Japan*

[20-P15]

“Formation and thermoelectric properties of stacked $\beta\text{-FeSi}_2$ nanodots on Si substrates”

Shuto Yamasaka¹, Yoshiaki Nakamura^{1,2}, Shinya Tsurusaki¹, Shotaro Takeuchi¹, and Akira Sakai¹

¹*Osaka University, Graduate School of Engineering Science, Toyonaka, Osaka 560-8531, Japan*

²*PRESTO-JST, 4-1-8 Honmachi, Kawaguchi, Saitama 331-0012, Japan*

[20-P16]

“Formation of epitaxial nanodots on Si substrates with well-controlled interfaces and their properties”

Yoshiaki Nakamura^{1,2} and Masakazu Ichikawa³

^{1,2}*Osaka University, Osaka 560-0043, Japan*

³*The University of Tokyo, Tokyo, Japan*

[20-P17]

“Epitaxial growth of Fe-based nanodots on Si substrates by controlling nanointerface”

Hideki Matsui¹, Yoshiaki Nakamura^{1,2}, S. Takeuchi¹, and A. Sakai¹

¹*Osaka University, Graduate School of Engineering Science, 1-3 Toyonaka, Osaka 560-0043, Japan*

²*PRESTO-JST, 4-1-8 Honmachi, Kawaguchi, Saitama 331-0012, Japan*

[20-P18]

“3D visualization of crystal structures of semiconducting silicides on WEBGL-enabled modern web browsers”

Ryutarou Ban and Hiroharu Sugawara

Graduate School of System Design, Tokyo Metropolitan University, Tokyo 191-0065, Japan

[20-P19]

“Ga doped Si_{1-x}Ge_x bulk crystal with homogenous composition and its thermoelectric properties”

M. Omprakash^{1,2}, V. Nirmal Kumar^{1,2}, M. Arivanandhan^{1,3}, T. Koyama¹, Y. Momose¹, H. Ikeda^{1,3}, H. Tatsuoka³, Y. Okano⁴, T. Ozawa⁵, Y. Inatomi⁶, S. Moorthy Babu⁷, and Y. Hayakawa^{1,3}

¹*Research Institute of Electronics, Shizuoka University, Hamamatsu-432 8011, Japan*

²*Graduate School of Science and Technology, Shizuoka University, Hamamatsu-432 8011, Japan*

³*Faculty of Engineering, Shizuoka University, Hamamatsu-432 8011, Japan*

⁴*Osaka University, Osaka, Japan*

⁵*Shizuoka Institute of Science and Technology, Fukuroi, Shizuoka 437-8555, Japan*

⁶*Japan Aerospace Exploration Agency, 3-1-1 Yoshinodai, Kanagawa 229-8510, Japan*

⁷*Crystal Growth Centre, Anna University, Chennai, India*

[20-P20]

“Processing of fine β -FeSi₂ powders and formation of β -FeSi₂ by electric discharge plasma activated sintering”

Matsumoto¹, H. Katsumata¹, M. Sawada¹, T. Takahashi², H. Souma², I. Azumaya², and M. Ishiyama²

¹*Department of Electronics and Bioinformatics, Meiji University, Kawasaki 214-8571, Japan*

²*Elexnic, Inc., 2-20-4 Komatsubara, Zama 252-0002, Japan*

[20-P21]

“Synthesis of Mg₂Si with spark plasma sintering method”

Tomoyuki Nakamura^{1,2}, Masahiro Minowa², Jyunya Matsuno¹, Asumi Sasaki¹, Koya Arai¹, and Keishi Nishio¹

¹*Tokyo University of Science, Department of Materials Science and Technology, 6-3-1 Niijuku, Katsushika-ku, Tokyo 125-8585, Japan*

²*SWCC SHOWA CABLE SYSTEMS CO., LTD. 4-1-1 Minami-Hashimoto Chuo-Ku Sagamihara-shi, Kanagawa-ken, 252-0253 Japan*

[20-P22]

“Synthesis and characterization of Sb doped Mg₂Si by spark plasma sintering method”

Koya Arai, Asumi Sasaki, Yuto Kimori, Tsutomu Iida, and Keishi Nishio

Tokyo University of Science, Department of Materials Science and Technology, 6-3-1 Niijuku, Katsushika-ku, Tokyo 125-8585, Japan

[20-P23]

“Metathesis reaction route to Mg₂Si fine particles: formation mechanism and their lithium storage properties”

Hiroshi Itahara¹, Takahiro Yamada², Song-Yul Oh¹, Ryoji Asahi¹, Haruo Imagawa¹, and Hisanori Yamane²

¹*Toyota Central Research & Development Labs., Inc., 41-1 Yokomichi Nagakute, Aichi 480-1192, Japan.*

²*Tohoku University, 2-1-1 Katahira, Aoba-ku, Sendai 980-8577, Japan.*

[20-P24]

“Exploring the possibility of semiconducting BaSi₂ for thin-film solar cell applications”

Takashi Suemasu^{1,2}

¹*University of Tsukuba, Institute of Applied Physics, Tsukuba 305-8573, Japan*

²*JST-CREST, Tokyo, 102-0075, Japan*

[20-P25]

“Energetic evaluation of the possibility of interstitial compound formation of BaSi₂ with 2p-, 3s-, and 3d-elements by first-principle calculations”

Yoji Imai^{1,2}, Mitsugu Sohma¹, and Takashi Suemasu²

¹*University of Tsukuba, Institute of Applied Physics, Tsukuba 305-8573, Japan*

²*National Institute of Advanced Industrial Science and Technology, Tsukuba 305-8565, Japan*

[20-P26]

“Time-resolved photoluminescence properties of β -FeSi₂ thin films”

Yoshikazu Teraï¹ and Yoshihito Maeda²

¹*Graduate School of Science and Engineering, Kagoshima University, Kagoshima 890-0065, Japan*

²*Department of Computer Science and Electronics, Kyushu Institute of Technology, Fukuoka 820-8502, Japan*

[20-P27]

“Photonic crystals composed of β -FeSi₂ with amorphous Si cladding layers”

H. Tokushige¹, T. Endo¹, K. Hiidome¹, K. Saiki¹, S. Kitamura¹, T. Katsuyama¹, N. Ikeda², Y. Sugimoto², and Y. Maeda³

¹*Graduate School of Engineering, University of Fukui, Fukui 910-8507, Japan*

²*National Institute for Materials Science, Tsukuba 305-0047, Japan*

³*Graduate School of Computer Science and System Engineering, Kyushu Institute of Technology, Fukuoka 820-8502, Japan*

[20-P28]

“Characterization of the silicon/ β -FeSi₂ nanocrystallites heterostructures in the NIR photodetection at low temperature”

Alexander Shevlyagin¹, Dmitry Goroshko^{1,2}, Evgeniy Chusovitin¹, Konstantin Galkin¹, and Nikolay Galkin^{1,2}

¹*Institute of Automation and Control Processes FEB RAS, Radio St. 5, 690041 Vladivostok, Russia*

²*Far Eastern Federal University, Suhanova St. 8, 690950 Vladivostok, Russia*

[20-P29]

“Feasibility study of thermal radiation control by high refractive index silicides”

Motofumi Suzuki, Shinta Suganuma, and Yasuyuki Kaneko

Kyoto University, Kyoto 615-8540, Japan

[20-P30]

“High-pressure synthesis of Mg₂Si thermoelectric material”

Y. Mori, K. Takarabe

Okayama University of Science, Okayama 700-0005, Japan