APAC-Silicide 2025 PROGRAM

July 19, 2025

Opening Session (Hybrid Session)

13:00-13:10 **Opening address**
Prof. Takahiro Yamada, Chair of APAC-Silicide 2025

13:10-13:50 **Plenary Talk**
Progress in Silicide Semiconductor Research: A Retrospective on Recent Decades
Prof. Hirokazu Tatsuoka: Shizuoka University, Japan

Short Break 13:50-14:00

Session 1-Sat-1 Silicide Green Technology, Thermoelectrics I

14:00-14:30 Sat-p-I1 (Invited)
Graphite Tesla valve for thermal rectification
Prof. Masahiro Nomura: The University of Tokyo, Japan

14:30-14:45 Sat-p-O1
Measurement of thermal conductivity of Mg_2Si thermoelectric materials under high pressure using a 6-axis multi-anvil press
Yoshihisa Mori, Yuka Akimoto and Ryo Okami
Okayama University of Science

14:45-15:00 Sat-p-O2
Effect of Amorphous Si Capping on Mg_3Bi_2-based Thin Films for Thermoelectric Applications
Akito Ayukawa, Takeru Kuriyama, Koki Nejo, Haruhiko Udono and Shunya Sakane
Ibaraki University

15:00-15:15 Sat-p-O3
Thin Film Growth and Characterization of $AgBa_2Si_3$ and Dopant Exploration via First-Principles Calculation
Kimimaru Kajihara[1], Takamitsu Ishiyama[1], Yoichiro Koda[2], Masami Mesuda[2], Syuta Honda[3], Kaoru Toko[1] and Takashi Suemasu[1]
[1]University of Tsukuba, [2]Tosoh Corporation, [3]Kansai University

Break 15:15-15:30

Session 2-Sat-2 Silicide Green Technology, Thermoelectrics II

15:30-16:00 Sat-p-I2 (Invited)
Enhancing the power factor of Si-based thermoelectric materials
Prof. Neophytos Neophytou: University of Warwick, UK

16:00-16:30 Sat-p-I3 (Invited)
High thermoelectric properties of Mg_2Sn and Mg_2Ge single crystals with engineered lattice defects
Prof. Kei Hayashi: Tohoku University, Japan

16:30-16:45 Sat-p-O4
Thermoelectric characterization and crystal structure analysis of a stannide Na_2CdSn_5
Takahiro Yamada[1], Yuki Asamiya[1, 2], and Hisanori Yamane[1]
[1]IMRAM Tohoku University, [2]Tohoku University

16:45-17:00 Sat-p-O5
Influence of Targeted Dopants on the Thermoelectric Behavior of $SrSi_2$-Based Materials
Vikrant Trivedi[1], Naohito Tsujii[1], Takao Mori[1,2]
[1]MANA National Institute for Materials Science (NIMS), [2]University of Tsukuba

17:00-17:15 Sat-p-O6
Power Generation Characteristic of an Undoped α-$SrSi_2$ Thermoelectric-Chip Fabricated by Melt Growth and its Mechanical Toughness
Hiroya Oishi, Haruno Kunioka, Taishi Miyagawa, Hirari Suzuki, Rena Hatanaka, Rikuya Seki, Kohei Uchida and Tsutomu Iida
Tokyo University of Science

Break 17:15-17:30

17:30-19:30 **Poster Session**

July 20, 2025

Session 3-Sun-1 Silicide Green Technology, Photovoltaics & Energy I

8:45-9:15 Sun-a-I4 (Invited)
Point defects in doped and undoped $BaSi_2$ identified and analyzed by electron paramagnetic resonance, Photoluminescence and Density Functional Theory
Prof. Serge Gambarelli: University Grenoble Alpes, France

9:15-9:45 Sun-a-I5 (Invited)
Two-dimensional Silicon Nanosheets: Tuning Optical Properties by Controlling Surface Chemistry
Prof. Matthew G. Panthani: Iowa State University, USA

9:45-10:00 Sun-a-O1
Formation of high-photoresponsivity $BaSi_2$ films by sputtering and solar cell operation of n-$BaSi_2$/n+Si heterojunction diodes under AM1.5 illumination
T. Sato[1], K. Hayashi[1], R. Du[1], Y . Koda[2], M. Mesuda[2], K. Toko[3], and T. Suemasu[3]
[1] Graduate School of Science and Technology, University of Tsukuba, [2]Tosoh Corp., [3] Department of Applied Physics, University of Tsukuba

10:00-10:15 Sun-a-O2
Investigation of HTL materials by simulation for $BaSi_2$ hetero-junction solar cells
Yuji Ishiguro[1], Sho Aonuki[1], Koki hayashi[1], Kaoru Toko[2] and Takashi Suemasu[2]
[1] Graduate School of Science and Technology, University of Tsukuba, [2]Department of Applied Physics, University of Tsukuba

Break 10:15—10:30

Session 4-Sun-2 Silicide Green Technology, Photovoltaics & Energy II

10:30-11:00 Sun-a-I6 (Invited)
Application of silicide materials to energy harvesting devices
Prof. Yasuyoshi Kurokawa: Nagoya University, Japan

11:00-11:15 Sun-a-O3
Unprecedented Reduction of Carrier Density in Polycrystalline p/n-type Ge Thin Films through Hydrogen Passivation
Koki Nozawa, Takashi Suemasu and Kaoru Toko
University of Tsukuba

11:15-11:30 Sun-a-O4
Deep Learning-Based Automated and Fast Analysis of Time-Series Images
Takamitsu Ishiyama[1,2], Takashi Suemasu[1], and Kaoru Toko[1]
[1]University of Tsukuba, [2]JSPS Research Fellow

11:30-11:45 Sun-a-O5
Enhancing Anode Performance via Substrate Adhesion Control of Si Thin Films
Yo Eto, Koki Nozawa, Takashi Suemasu, and Kaoru Toko
University of Tsukuba

11:45-12:00 Sun-a-O6
Application of ß-$FeSi_2$-Based Bandpass Filters in Wavelength-Selective Infrared Drying Systems
Xuanwei Zhang, Kyoko Namura and Motofumi Suzuki
Kyoto University

Lunch Break 12:00—13:30

Session 5-Sun-3 Characterization and Electronic and Photonic Applications I

13:30-14:00 Sun-p-I7 (Invited)
Pressure Evolution of Electronic States in Mg_2Si and Other Semiconductors Studied by Infrared Spectroscopy
Prof. Hidekazu Okamura: Tokushima University, Japan

14:00-14:30 Sun-p-I8 (Invited)
Tellurides as Zintl Phases?
Dr. Simon Steinberg: RWTH Aachen University, Germany

14:30-14:45 Sun-p-O7
Electronic Properties and Chemical Bonding of Semiconducting Silicides
Motoharu Imai
National Institute for Materials Science (NIMS)

14:45-15:00 Sun-p-O8
I-V characteristics analysis of planer type Mg_2Si pn junction PDs fabricated by Ag thermal diffusion on n-Mg_2Si substrate
Hibiki Katsumata, Takumi Shimizu, Ryosuke Furuta, Kosuke Shimano, Shunya Sakane and Haruhiko Udono
Ibaraki University

15:00-15:15 Sun-p-O9
Photoresponse properties of n-ß-$(Fe_{1-x}Ru_x)Si_2$/p-Si heterojunction
Takumi Takahashi, Yutaka Sakurai, Reo Idemori and Yoshikazu Terai
Kyushu Institute of Technology

15:15-15:30 Sun-p-O10
Fabrication of n-Ru_2Si_3/p-Si heterojunction devices and their photoresponse properties
Kohei Morimoto and Yoshikazu Terai
Kyushu Institute of Technology

Break 15:30-15:50

Session 6-Sun-4 Characterization and Electronic and Photonic Applications II (Hybrid Session)

15:50-16:20 Sun-p-I9 (Invited)
Transition metal monosilicide films on silicon for thermoelectronics and spintronics
Prof. Nikolay G. Galkin: Institute of Automation and Control Processes FEB RAS, Russia

16:20-16:50 Sun-p-I10 (Invited)
Structure and electronic properties of RuSi, OsSi, ReSi, RhSi and IrSi
Prof. Dmitri B. Migas: Belarusian State University of Informatics and Radioelectronics, Belarus

16:50-17:20 Sun-p-I11 (Invited)
Make experiments more efficient: Two simple and useful approaches. Example: Mg_2Si growth for photovoltaic and thermoelectric applications
Dr. Alexander S Gouralnik: Institute of Automation and Control Processes FEB RAS, Russia

17:20-17:35 Sun-p-O11
Mg_2Si and ε-FeSi contacts for SWIR narrowband Si based photodetectors
Igor M. Chernev[1], Evgeny Y. Subbotin[1], Alexey G. Kozlov[2], Dmitrii L. Goroshko[1], Konstantin N. Galkin[1], Sofia A. Sinotova[2], Alena V. Prikhodchenko[2], Alexey O. Lembikov[2], Glikeriya A. Prokopeva[2], Nikolay G. Galkin[1]
[1]Institute of Automation and Control Processes FEB RAS, [2]Institute of High Technologies and Advanced Materials, Far Eastern Federal University

17:35-17:50 Sun-p-O12
High-aspect ratio magnesium silicide vertical core-shell heterostructures
Evgenii Y. Subbotin[1], Alexey G. Kozlov[2], Dmitry V. Pavlov[1], Oleg E. Lisenkov[1], Andrey D. Udilov[1], Glikeriya A. Prokofeva[1], Dmitry L. Goroshko[1], Igor M. Chernev[1], Dmitry A. Khoroshilov[1], Sofia A. Sinotova[1], Nikolay G. Galkin[1]
[1]Institute of Automation and Control Processes FEB RAS, [2]Institute of High Technologies and Advanced Materials, Far Eastern Federal University

17:50-18:05 Sun-p-O13
Growth and transport characterization of doped Mg_2Si films
Evgeii Yu. Subbotin[1], Andrei D. Udilov[1], Glikeriya A. Prokofeva[1], Dmitry L. Goroshko[1], Alexey G. Kozlov[2], Igor M. Chernev[1], Oleg E. Lisenkov[1], Dmitry A. Khoroshilov[1], Sofia A. Sinotova[1], Nikolay G.Galkin[1]
[1]Institute of Automation and Control Processes FEB RAS, [2]Institute of High Technologies and Advanced Materials, Far Eastern Federal University

18:30—20:30 **Banquet**

Jul 21, 2025

Session 7-Mon-1. Silicide and Related Materials

9:30-10:00 Mon-a-I12 (Invited)
Crystal growth of functional silicon clathrates with sodium solutions
Prof. Haruhiko Morito: Tohoku University, Japan

10:00-10:30 Mon-a-I13 (Invited)
Towards devices based on silicon clathrate films
Prof. Thomas Fix: CNRS and University of Strasbourg, France

10:30-10:45 Mon-a-O1
Synthesis and characterization of In/Cu doped ternary Ge clathrate films
Koji Yasuoka[1], Tun Naing Aye[2], Rahul. Kumar[3], Himanshu S. Jha[1,2], Fumitaka Ohashi[1,2], Tetsuji. Kume[1,2]
[1]GNST, Gifu University, [2]Faculty of Engineering, Gifu University, [3]NIT, Gifu College

10:45-11:00 Mon-a-O2
High-Pressure Synthesis and Crystal Structures of Novel Chromium Silicides $MoSi_2$-type $CrSi_2$ and $PdGa_5$-type $CrSi_5$
Takuya Sasaki[1], Koichi Takano[1], Kitahara Takumi[1], Nico Alexander Gaida[1], Ken Niwa[1,2], Masashi Hasegawa[1,2]
[1]Nagoya University, Department of Materials Physics, [2]Nagoya University, Research Center for Crystalline Materials Engineering

11:00-11:15 Mon-a-O3
Epitaxial growth of Mg_3Sb_2 thin films on Si substrates and their infrared photoresponse
Nozomu Kiridoshi[1], Akito Ayukawa[1], Koki Nejo[1], Takeru Kuriyama[1], Wakaba Yamamoto[2], Satoru Yasuhara[2], Kohei Sato[2], Haruhiko Udono[1], and Shunya Sakane[1]
[1]Ibaraki University, [2]JEOL Ltd.

11:15-11:30 Mon-a-O4
Effects of deposition temperature on solid-phase crystallization of InGaAs thin films
Y. Kiyono, K. Nozawa, S. Jisol, T. Suemasu, and K. Toko
University of Tsukuba

Break 11:30-12:00

Closing Session

12:00-12:30

Award Ceremony
Closing Address

Poster Session Number List (First author's name and affiliation only)

P01. ***Epitaxial growth of $Ca(Ge_{1-x}Sn_x)_2$ crystal on Si substrate and its electrical properties***
Takashi Yoshizaki, Osaka University

P02. ***Formation of strain- and composition-controlled epitaxial GeSn films/Si and their thermoelectric properties***
Arata Shibagaki, Osaka Univerisity

P03. ***Syntheses and Electrical Properties of Anodic Aluminum Oxide Template-Assisted Grown Cobalt Germanide Nanowires***
Chiu-Yen Wang, National Taiwan University of Science and Technology

P04. ***Low-temperature syntheses of the group IV and V transition metal diborides from oxides and sodium metal involving a formation of water-glass***
Akira Hosono, IMRAM, Tohoku University

P05. ***Development of a Simulation Method for Thermal-to-Electric Power Generation Devices Based on Results on the Environmentally Benign Thermoelectric $SrSi_2$***
Kyohei Yazaki, Tokyo University of Science

P06. ***Thermoelectric Properties for Sn-Incorporated α-$SrSi_2$ Prepared by Melt Growth and Plasma Sintering Methods***
Hirari Suzuki, Tokyo University of Science

P07. ***Increase in Oxygen Composition x of MoO_x HTL in $MoO_x/BaSi_2$ Heterostructures by Introduction of a-Si:H Interface Layers for $BaSi_2$ Solar Cells***
Yuka Fukaya, University of Tsukuba

P08. ***Examination of passivation layers fabricated by sputtering for $BaSi_2$ heterojunction solar cells***
Koki Hayashi, University of Tsukuba

P09. ***First-Principles Evaluation on Epitaxial As-doped $BaSi_2$ Thin Films***
Nurfauzi Abdillah, University of Tsukuba

P10. ***Investigation of BaS hole transport layer for $BaSi_2$ thin film solar cells***
Ammara Firdous, University of Tsukuba

P11. ***Preparation of Fe-Substituted Higher Manganese Silicide Thermoelectric Materials by Solid-State Reaction and the Effects of Post-Annealing Treatment***
Hiromichi Ishikawa, Osaka Research Institute of Industrial Science and Technology

P12. ***Synthesis of Sr-based Silicides and related compounds using $CaSi_2$ Crystal Powders***
Yusuke Inoue, Shizuoka University

P13. ***Synthesis of Mg_2Si Nanosheet Bundle Powders using Mg Melt and Molten $MgCl_2$-Salt Mixtures***
Shalika Parakatawella, Shizuoka University

P14. ***Comparative Evaluation of Mg_2Si Thin Films: Direct Sputtering Deposition with an Mg_2Si Target vs. Solid-Phase Growth on Si Substrates with an Mg Target and Their Reproducibility***
Ryoga Toyama, Meiji University

P15. ***Structural and Optical Properties of SiO_x Thin Films Embedded with Si Quantum Dots Formed by Co-Sputtering for MIS Indoor Photovoltaic Applications***
Toshiya Kondo, Meiji University

P16. ***Development of high-pressure SPS apparatus and high-pressure synthesis of Mg_2Si and SiO_2***
Yoshihisa Mori, Okayama University of Science

P17. ***Development of Mg_2Si-Based SWIR Photodetectors via Ag Ion Implantation***
Hideto Takei, Ibaraki University

P18. ***Inhomogeneity of Electrical Properties in High-Purity Mg_2Si Single Crystals***
Kosuke Shimano, Ibaraki University

P19. ***Synthesis of $CrSi_2$ / Cr_2O_3 Nanocomposite using $CaSi_2$ and $CrCl_2{\cdot}6H_2O$***
Masahide Ogawa, Shizuoka University

P20. ***Predictions of the effect of isoelectronic doping on the thermoelectric properties ofα-$SrSi_2$ by first-principles calculations using the hybrid functional***
Yuki Hiraoka, Tokyo University of Science

P21. ***Effect of $CaAl_4$–Ni source preparation on $CaSi_2$ film synthesis by close-spaced evaporation for 2D Si nanosheet formation***
Ryota Takagaki, University of Yamanashi

P22. ***Observation of etch pits by wet-etching of Mg_2Si crystal***
Zenji Fujihisa, Ibaraki University

P23. ***Reduction of cracks in $BaSi_2$ films deposited on p-type Si(100) substrates by vacuum evaporation***
Takumi Ishikawa, Tokushima University

P24. ***Introduction of low-temperature $BaSi_2$ layer for the deposition of thick $BaSi_2$ films by vacuum evaporation***
Keiko Tsutsui, Tokushima University

P25. ***Spectral photosensitivity of Mg_2Si pn-junction PDs depending on the graded junction depth in short wavelength infrared range***
Ryosuke Furuta, Ibaraki University

P26. ***Characterization of in-plain tensile strained Ge films grown on β-$FeSi_2$***
Soichiro Nagatomo, Kyushu Institute of Technology

P27. ***Optimization of growth conditions for topological insulator Bi_2Se_3/CdSe/Bi_2Se_3***
Yuta Yamagata, Kyushu Institute of Technology

P28. ***Formation and Characterization of α-Fe_2O_3 Films by RF Magnetron Sputtering with Different Target Materials***
Yuta Morimoto, Meiji University

P29. ***Sputtering Growth of Polycrystalline Mg-IV Alloys Thin Films for Thermoelectric Applications***
Takenori Nakajima, University of Tsukuba

P30. ***Analysis of Temperature-dependent Open Circuit Voltage of Mg_2Si pn-junction for Thermophotovoltaic Application***
Takumi Shimizu, Ibaraki University

P31. ***Polycrystalline Ge film on glass/plastic substrates as an alternative to single crystal substrates for bottom cell application in multi-junction solar cells***
Shintaro Maeda, University of Tsukuba

P32. ***Evaluation of fundamental properties of HN-D_2 for HTL application to $BaSi_2$***
M. Hirai, University of Tsukuba

P33. ***Long-Term Stability of Ohmic Contacts on n-Type 4H-SiC under High-Temperature Conditions***
T. Fukuzawa, Hiroshima University

P34. ***Thin film growth and characterization of InSb on Si grown by RF magnetron sputter deposition and post-annealing***
Aito Koganezawa, Ibaraki University

P35. ***Deposition of magnesium silicide polycrystalline thin films with high-power impulse magnetron co-sputtering***
H. Kobayashi, Tokyo Metropolitan University

P36. ***EPR characterization of high-photoresponsivity $BaSi_2$ films formed by sputtering***
A. Nakamura, University of Tsukuba

P37. ***Synthesis and evaluation of optical properties of SiGe alloy clathrate films***
Shota Iio, Gifu Univ

P38. ***Low-energy vibrational spectroscopy of Na-containing type II clathrate***
Taiu Hiraishi, Gifu Univ

P39. ***Low Power Hydrogen Sensing with Nickel-silicide Nanosheet Formed on SiO_2***
Ryota Watanabe, Aichi Institute of Technology

P40. ***Synthesis of MoO_3/Graphite Composite Structures***
Riku Sasaki, Shizuoka University

P41. ***Spin valve effects in $Fe_3Si/FeSi_2/Fe_3Si$ trilayer films***
Ken-ichiro Sakai, Kurume College, KOSEN

P42. ***Lateral type local spin valves comprising epitaxially-grown β-$FeSi_2$ layers***
Ken-ichiro Sakai, Kurume College, KOSEN