

Welcome to the 37th Symposium on Phase Change Oriented Science (PCOS2025)

On behalf of the PCOS Committee, we welcome you to the 2025 Symposium on Phase Change Oriented Science (PCOS) at KKR Hotel Atami, Shizuoka, Japan.

It is well known that the rearrangement of internal chemical bonding (Phase Change) will give rise to a myriad of changes in the optical, electrical, thermal, and magnetic properties of substances. Interestingly, such variations are typically produced rapidly (even in response to femtosecond laser pulses) and reversibly (10^{5-10} cycles or more) leading to the bistable behavior of so-called phase-change materials. With these particularities, phase-change materials such as Ge-Sb-Te and Ag-In-Sb-Te have been applied to optical disks such as DVDs and Blu-ray disks and electrical memories, the so-called Phase-Change Random Access Memory (PCRAM); moreover, their atomic and electronic structures have been of great interest to researchers in numerous academic fields.

This year, there will be 14 oral talks, 9 invited and 5 contributed, as well as 24 poster presentations on a variety of topics relating to phase-change materials and their properties, applications of phase-change technology to other fields, as well as thermoelectric applications.

We hope you will enjoy these talks and have fruitful discussions over the next two days.

Masashi Kuwahara (Chair of PCOS)

PCOS2025 Co-Chairs

Toshiharu Saiki (*Keio University*)

Masashi Kuwahara (*AIST*)

Symposium Committee

The Society of Phase Change Oriented Science

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Noboru Yamada

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Yuji Sutou, Tohoku University

Hiroshi Tanimura, Research Institute for Electromagnetic Materials

Takashi Yagi, National Institute of Advanced Industrial Science and Technology

Keiichiro Yusu, Japan Science and Technology Agency

Shogo Hatayama, National Institute of Advanced Industrial Science and Technology

PCOS2025 Co-Chairs

Toshiharu Saiki, Keio University

Masashi Kuwahara, National Institute of Advanced Industrial Science and Technology

PCOS2025 TECHNICAL PROGRAM

November 20th (Thursday), 2025

13:00 – 13:05 **Opening Remark:** Symposium Co-Chair, Toshiharu Saiki (*Keio University*)

Session 1

Session Chairs: Yuji Sutou (*Tohoku University*)

Toshimichi Shintani (*National Institute of Advanced Industrial Science and Technology*)

13:05 – 13:35 (Invited)

1. Physical Implementation of Autonomous Target Search by Colloidal and Environmental Systems with Memory Functions

Toshiharu Saiki

Department of Electronics and Electrical Engineering, Keio University, 3-14-1 Hiyoshi, Kohoku, Yokohama, Kanagawa 223-8522, Japan

13:35 – 14:05 (Invited)

2. From structural polymorphism to functional device applications: Cr-Mn-Te-based transition metal chalcogenide thin films

Mihyeon Kim^{1*}, Yuta Saito^{1,2}, and Yuji Sutou^{1,3}

¹ *Dept. of Materials Science, Graduate Sch. of Engineering, Tohoku University, Sendai, Japan*

² *Research Center for Green X-Tech, Tohoku University, Sendai, Japan*

³ *WPI Advanced Institute for Materials Research, Tohoku University, Sendai, Japan*

14:05 – 14:35 (Invited)

3. Control of Vapor-Rich Bubble Dynamics and Induced Flow Using Photothermal Heating

Kyoko Namura and Motofumi Suzuki

Department of Micro Engineering, Kyoto University, Kyoto Daigaku-Katsura, Nishikyo-ku, Kyoto, 615-8540, Japan,

14:35 – 14:50 Break

Session 2 Poster Session (12 posters)

14:50 – 16:20

P1. Investigation of Local Electronic Structure of a Single C₆₀ Molecule on a C₆₀ Monolayer Surface

Mitsuto Wada, Ryota Kawai, Naoya Saeki, Wataru Hamada and Satoshi Katano

Dep. Appl. Chem., Toyo Univ, 2100, Kujirai, Kawagoe, Saitama 350-8585, Japan

P2. Phase Control of Layered VTe₂ Thin Films by Controlling Composition

Shuhei Orihara (M2)¹, Yi Shuang^{1,2}, Daisuke Ando¹, and Yuji Sutou^{1,2}

¹ *Grad School of Eng., Tohoku Univ., 6-6-11 Aoba-yama, Aoba-ku, Sendai 980-8579, Japan*

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

P3. Direct observation of inter-tube dynamics in photoexcited CNTs

Riyo Nagao¹, Nagisa Yamamoto¹, Gael Privault¹, Jun-ichi Fujita¹, Hiroo Suzuki², Yasuhiko Hayashi², Shinya Koshihara¹, Arnaud Arbouet^{1,3}, and Masaki Hada¹

¹ University of Tsukuba, Ibaraki, 305-8573, Japan

² Okayama University, Okayama, 700-8530, Japan

³ DYNACOM (Dynamical control of Materials Laboratory) – IRL 2015, CNRS, Univ. Rennes, Univ. Tokyo, Japan

P4. Fabrication of amorphous ternary Ge-S-Te thin films by vacuum evaporation for the selector application

Daiki Inose¹, Mihyeon Kim¹, Shogo Hatayama², and Yuta Saito^{1,2,3}

¹ Department of Materials Science, Graduate School of Engineering, Tohoku University, Sendai 980-8579, Japan

² Semiconductor Frontier Research Center, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba 305-8568, Japan

³ Research Center for Green X-Tech, Tohoku University, Sendai 980-8579, Japan

P5. Coverage-dependent Structural Transition of Adsorbed Ferrocene Thiolate Derivative Monolayer

Daisuke Hoshina, Kazuya Kinoshita, Ibuki Kibishi, Yuto Matsuzaki, and Satoshi Katano

Dep. Appl. Chem., Toyo Univ, 2100, Kujirai, Kawagoe, Saitama 350-8585, Japan.

P6. Fabrication of a Dense α -MnTe Thin Film by High-Temperature Deposition Method

Shogo Kakimoto^{1,2}, Shota Awaduhara^{1,2}, Masashi Kuwahara², Kunio Okimura³, Joe Sakai⁴ and Satoshi Katano

¹ Dep. Appl. Chem., Toyo Univ, 2100, Kujirai, Kawagoe, Saitama 350-8585, Japan.,

² National Institute of Advanced Industrial Science and Technology(AIST),

³ Tokai Univ.,

⁴ Toshima Manufacturing Co., Ltd.

P7. Phase Transformation Effects on Hydrogen Diffusion in Cylindrical Pd and Pd-Ag Alloy Membranes

Hiroto OGURA¹, Makoto Ryo HARADA², Helmut Takahiro UCHIDA^{1,2,3*}

¹ Graduate School of Engineering, Tokai University, 259-1292, Hiratsuka, Japan

² Research Institute of Science and Technology Tokai University, Hiratsuka 259-1292, Japan

³ Graduate School of Science & Technology, Tokai University, Hiratsuka 259-1292, Japan

P8. Formation Phases and Electrical Properties of Thermoelectric GeX_4Te_7 (X=Bi, Sb) Materials

Kakeru Moriyama, Daiki Imai, and Atsuko Kosuga

Graduate School of Science, Osaka Metropolitan University, Osaka, Osaka 558-8585, Japan

P9. Phase modulation section using MnTe thin film for low-loss phase-change optical switches

Tomoya Yazaki¹, Masashi Kuwahara², Hitoshi Kawashima², and Hiroyuki Tsuda¹

¹ Graduate School of Science and Technology, Keio University, Yokohama 223-8522, Japan

² National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, 305-8568, Japan

P10. Formation Phases of Crystalline-amorphous Mixture of GeSbTe -based Thermoelectric Materials

Kyuta Takeuchi¹, Satoshi Hiroi², Yuki Takao¹, and Atsuko Kosuga¹

¹ Graduate School of Science, Osaka Metropolitan University, Osaka, Osaka 558-8585, Japan

² Faculty of Materials for Energy, Shimane University, Matsue, Shimane 690-8524, Japan

P11. Investigation of the phase-change behaviors of Zn-Te-based thin films

Kokoro Sawada(M1)¹, Yi Shuang^{1,2}, Daisuke Ando¹, Yuji Sutou^{1,2}

¹ Graduate School of Eng. Tohoku Univ.1, 6-6-11 Aoba-yama Aoba-ku Sendai 980-8579, Japan

² Tohoku Univ.(AIMR)2, 2-1-1 Katahira Aoba-ku Sendai, 980-8577, Japan

P12. The effect of Si doping on electrical conduction of (Al, Mn) N ferromagnetic films

Shotaro Tanaka, Kai Chen, Kei Kuwahara, Jundong Song, Takashi Harumoto, and Ji Shi
Department of Materials Science and Engineering, Institute of Science Tokyo,

Session 3

Session Chairs: Toshiharu Saiki (Keio University)
Takashi Harumoto (Institute of Science Tokyo)

16:20 – 16:50 (Invited)

4. Thermoelectric physics of arrayed carbon nanotubes from thermoelectric figure of merit to THz detection

Kazuhiro Yanagi
Tokyo Metropolitan University

16:50 – 17:10

5. Phase change material programmed photonics: plasmonic, dielectric, and interband resonances

Robert E Simpson¹, Eleanor Gagg¹, Daniel Chambers-Sims¹, Nur Qalishah Adanan²,
Simon Wredh², Ting Yu Teo², Li Lu², Liu Yan^{3,4}, Zhaogang Dong^{2,3,4}, and Joel K W Yang²

¹ School of Engineering, University of Birmingham, UK

² Singapore University of Technology and Design, Singapore

³ Quantum Innovation Centre (Q.InC), A*STAR, Singapore

⁴ Institute of Materials Research and Engineering (IMRE), A*STAR, Singapore

17:10 – 17:30

6. Reversible Imprinting of Laser-Induced Periodic Surface Structures in Thin Films of Ge₂Sb₂Te₅ Integrated with Rib Waveguides

P. Lazarenko¹, V. Kovalyuk², E. Kitsyuk³, A. Prokhotdov^{1,2}, A. Golikov, V. Takáts⁴, A. Nevzorov^{1,2},
E. Menshikov⁵, I. Sinev⁶, S. Kozyukhin⁷, G. Goltsman⁸, V. Svetikhin³, and A. Kolobov⁹

¹ National Research University of Electronic Technology, Zelenograd, Russia

² University of Science and Technology MISIS, Moscow, Russia

³ Scientific-Manufacturing Complex "Technological Centre", Zelenograd, Russia

⁴ Institute for Nuclear Research, Debrecen, Hungary

⁵ ITMO University, St. Petersburg, Russia

⁶ Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland

⁷ Kurnakov Institute of General and Inorganic Chemistry of the RAS, Moscow, Russia

⁸ National Research University Higher School of Economics, Moscow, Russia

⁹ Herzen State Pedagogical University of Russia, 191186 St. Petersburg, Russia

17:30 – 17:50

7. Understanding local phase transition phenomena and their functionalities in thin film materials

Shunsuke Mori

Department of Advanced Materials Science, Graduate School of Frontier Sciences, The University of Tokyo,
Kashiwa 277-8561, Japan

19:00-21:00 Conference dinner

November 21st (Friday), 2025

Session 4

Session Chairs: Takashi Yagi (*National Institute of Advanced Industrial Science and Technology*)
Hiroshi Tanimura (*Research Institute for Electromagnetic Materials*)

9:00 – 9:30 (Invited)

8. Elastic Modulus Determination through Coherent Phase Transition Hysteresis in Pd-H Systems

Helmut Takahiro UCHIDA^{1,2}

¹ Graduate School of Engineering, Tokai University, 259-1292, Hiratsuka, Japan

² Research Institute of Science and Technology Tokai University, Hiratsuka 259-1292, Japan

9:30 – 10:00 (Invited)

9. Neuromorphic Devices and Biological Neurons for Edge AI Computing

Shima Hisashi, Kusaka Yasuyuki, and Odaka Haruki

National Institute of Advanced Industrial Science and Technology (AIST)

10:00 – 10:20

10. High-throughput time-domain thermoreflectance using multiple delays and machine learning analysis

Takashi Yagi, Hiroto Arima and Yuichiro Yamashita

National Metrology Institute of Japan (NMIJ), National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Ibaraki 305-8563, Japan

10:20 – 10:35 Break

Session 5

Session Chairs: Yuta Saito (*Tohoku University*)
Muneaki Hase (*University of Tsukuba*)

10:35 – 11:05 (Invited)

11. Two-dimensional characterization of forming operation of AlTeN layers by scanning internal photoemission microscopy

K. Shiojima¹, H. Imabayashi¹, K. Komatsu², T. Iwasaki², Y. Wakisaka² and T. Daidou²

¹ Univ. of Fukui, 3-9-1 Bunkyo, Fukui-shi, Fukui 910-8507, Japan

² Kioxia Corporation, Yokkaichi-shi, Mie 512-8550, Japan

11:05 – 11:25

12. A combined Raman scattering and resistivity study of the crystallization process of Ge₂Sb₂Te₅

V. Pestova¹, D. Goroshko², A. Romashkin¹, A. Yakubov¹, E. Kitsyuk³, S. Kozyukhin⁴,

A. Sherchenkov¹, A. Kolobov⁵, and P. Lazarenko¹

¹ National Research University of Electronic Technology, 124498 Zelenograd, Russia

² Institute of Automation and Control Processes of FEB RAS, 690041 Vladivostok, Russia

³ Scientific Manufacturing Complex "Technological Centre", 124498 Zelenograd, Russia

⁴ Kurnakov Institute of General and Inorganic Chemistry RAS, 119991 Moscow, Russia

⁵ Herzen State Pedagogical University of Russia, 191186 St. Petersburg, Russia

Taking group photos in the Conference Room

11:35 – 13:00 Lunch Break

Session 6 Poster Session (12 posters)

13:00 – 14:30

P13. Phase Change Switching Accompanied by Magnetic Property Change in CrTe Films

Takuya Tsuruta (M2)¹, Yi Shuang^{1,2}, Daisuke Ando¹, Yuji Sutou^{1,2}

¹ Graduate School of Eng. Tohoku Univ., 6-6-11 Aoba-yama Aoba-ku Sendai 980-8579, Japan

² Tohoku Univ.(AIMR)², 2-1-1 Katahira Aoba-ku Sendai, 980-8577, Japan

P14. Effect of Ethanol Addition on Bubble Detachment from Microelectrodes during Water Electrolysis

Yosei Noda¹, Kohei Miyazaki², Kyoko Namura¹, Motofumi Suzuki¹

¹ Department of Micro Engineering, Kyoto University, Kyoto Daigaku-Katsura, Nishikyoku, Kyoto, 615-8540, Japan

² Graduate School of Engineering, Kobe University, 1-1 Rokkodai, Nada, Kobe, 657-8501, Japan,

P15. Evaluation of instantaneous temperature distribution around water vapor microbubbles

Kyoshiro Narihira¹, Seiji Fukuhara¹, Naoki Yasuda¹, Keisuke Fujii², Kyoko Namura¹, and Motofumi Suzuki¹

¹ Department of Micro Engineering, Kyoto University, Kyoto Daigaku-Katsura, Nishikyoku-ku, Kyoto 615-8540, Japan;

² Fusion Energy Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6305, United States of America

P16. Observation of Structural Changes of Fullerene Adsorbed on Au(110)

Ryota Kawai, Mitsuto Wada, Naoya Saeki, and Satoshi Katano

Faculty of Science and Engineering, Toyo Univ, 2100 Kujirai, Kawagoe-shi, Saitama-ken 350-8585, Japan.

P17. Phase-change behaviors in sputter-deposited Ti-Te thin films

Takuto Tezuka¹, Yi Shuang^{1,2}, Daisuke Ando¹, and Yuji Sutou^{1,2}

¹ Engineering, Tohoku Univ., Sendai, Japan

² Advanced Institute for Materials Research, Tohoku Univ., Sendai, Japan

P18. Structure-dependent Polar Kerr Rotation in CoPt/AlN Layered Films

Kejia Zhang¹, Zhenghe Wang², Kai Chen¹, Jundong Song¹, Takumi Sannomiya¹, Zhengjun Zhang², Takashi Harumoto¹, and Ji Shi¹

¹ Department of Materials Science and Engineering, Institute of Science Tokyo

² School of Materials Science and Engineering, Tsinghua University

P19. Investigation of resistive switching behavior in MnTe₂ device

Shih-yuan Li¹, Yi Shuang^{1,2}, Daisuke Ando¹ & Yuji Sutou^{1,2}

¹ Department of Materials Science and Engineering, Tohoku University, 6-6-11 Aoba-yama, Aoba-ku, Sendai 980-8579, Japan

² WPI-Advanced Institute for Materials Research, Tohoku University

P20. Phase Transition of MnTe Depending on Heating Temperature and Heating Time

Shota Awazuhara^{1,2}, Shogo Kakimoto^{1,2}, Masashi Kuwahara², Kunio Okimura³, Joe Sakai⁴, and Satoshi Katano¹

¹ Dep. Appl. Chem., Toyo Univ, 2100, Kujirai, Kawagoe, Saitama 350-8585, Japan.,

² AIST,
³ Tokai Univ.,
⁴ Toshima Mfg. Co., Ltd.

P21. Interface Characteristics of MoS₂ Channel Transistors Using Amorphous TiS₂ Electrodes

Toshiya Sasaki^{1,*}, Mihyeon Kim¹, Paul Fons², and Yuta Saito^{1,3}.

¹ Department of Materials Science, Graduate School of Engineering, Tohoku University, Sendai, Japan

² Department of Electronics and Electrical Engineering, Faculty of Science and Technology, Keio University, Yokohama, Japan

³ Research Center for Green X-Tech, Tohoku University, Sendai, Japan

P22. Observing the hot carrier relaxation in a 2H-MoTe₂ thin film with ultrafast optical transmission measurements

Yui Iwasaki¹, Gaël Privault¹, Takumi Fukuda², Muneaki Hase¹, Yusuke Arashida¹, and Masaki Hada¹

¹ University of Tsukuba, Tsukuba, Ibaraki 305-8573, Japan

² Okinawa Institute of Science and Technology, Kunigami-gun, Okinawa 904-0495, Japan

P23. Modulation of insulator metal transition of VO₂ films by GST capping layer

- Comparative study on Al₂O₃(001) and TiO₂(001) substrate-

Keisuke Kudo¹, Yiqi Liu¹, Kunio Okimura¹, Joe Sakai², Satoshi Katano³, and Masashi Kuwahara⁴

¹ Graduate School of Engineering, Tokai University

² Toshima Manufacturing Co., Ltd.

³ Faculty of Science and Engineering, Toyo University

⁴ National Institute of Advanced Industrial Science and Technology

P24 Dynamics of Janus Particles with Laser-Induced Phase Change

Kotaro Takano¹, Keisuke Hamano¹, Shogo Hatayama², Kotaro Makino², and Toshiharu Saiki¹

¹ Dept. of Electronics and Electronic Engineering, Keio University, 3-14-1 Hiyoshi, Kohoku-ku Kanagawa Yokohama 223-8522, Japan

² Semiconductor Frontier Research Center, National Institute of Advanced Industrial Science and Technology, Tsukuba Central 2, Umezono 1-1-1, Tsukuba 305-8568, Japan

Session 7

Session Chairs: Shogo Hatayama, (National Institute of Advanced Industrial Science and Technology)
Keiichiro Yusu (Japan Science and Technology Agency)

14:30 – 15:00 (Invited)

13. Engineering interlayer space in layered van der Waals materials

Masaki Nakano

College of Engineering, Shibaura Institute of Technology 3-7-5 Toyosu, Koto-ku, Tokyo 135-8548, Japan

15:00 – 15:30 (Invited)

14. Amorphous-Crystallization : A Promising Approach for Next-Generation Electronic Device Applications

Yuta Saito

¹ Research Center for Green X-Tech, Tohoku University, Sendai, Japan

² Department of Materials Science, Graduate School of Engineering, Tohoku University, Sendai, Japan

15:30 – 15:40 **Award Ceremony & Closing Remark:** Symposium Co-Chair, Masashi Kuwahara (AIST)