

Program of
**Symposium of 4th Innovative
Measurement and Analysis for
Structural Materials**

第4回 内閣府 SIP 革新的構造材料 先端計測拠点

国際会議／国内連携会議

SIP-IMASM 2018
Innovative measurement and analysis for structural materials

Nov. 13 – 15, 2018
Tokyo Headquarters (Science Plaza)
Japan Science and Technology Agency (JST)



The SIP-IMASM is supported by the Structural Materials for Innovation (SM⁴I), Cross-ministerial Strategic Innovation Promotion Program (SIP).

The 4th Symposium on Innovative Measurement and Analysis for Structural Materials (SIP-IMASM 2018)

Timetable of SIP-IMASM 2018

| Nov. 13 | | Nov. 14 | | Nov. 15 | |
|---------|--|---------|--|---------|---|
| 11:30~ | Registration | 9:30~ | CFRP Keynote 2 (40+10) R. Akkerman (U. Twente) | 9:00~ | Future scope Keynote 4 (40+10) P. Zaslansky (Charité) |
| 13:30~ | Guest speech, R. Kuroda(CAO) Welcome speech, T. Kishi (MOFA/SIP-SM [†] PD) Introduction, M. Ohkubo (AIST) | 10:20~ | Invited talk 3 N. Sato (Toray) | 9:50~ | Invited talk 4 N. Hosoda (NIMS) |
| 14:00~ | Metal Keynote 1 (40+10) O. Sobol & T. Böllinghaus (BAM) | 10:50~ | Coffee | 10:20~ | Coffee |
| 14:50~ | SIP-IMASM 1 (Metal) A. Yamazaki (U.Tsukuba) | 11:10~ | SIP-IMASM 3 (CFRP) M. Ohkubo (AIST) | 10:40~ | SIP-IMASM 13 (Ceramic) Y. Takeichi (KEK) |
| 15:10~ | Talk (Metal) A. Yousefi (Ibaraki U.) | 11:30~ | SIP-IMASM 4 (CFRP) M. Kimura (KEK) | 11:00~ | SIP-IMASM 14 (Metal) H. Mamiya (NIMS) |
| 15:30~ | Coffee | 11:50~ | Lunch | 11:20~ | SIP-IMASM 15 (Metal) S. Ri (AIST) |
| 15:50~ | Invited talk 1 N. Ishikawa (JFE Steel) | 13:30~ | Keynote 3 (40+10) M. Collins (Airbus) | 11:40~ | Closing |
| 16:20~ | SIP-IMASM 2 (Metal) P. Fons (AIST) | 14:20~ | SIP-IMASM 5 (CFRP) M. Tezura (U.Tsukuba) | 11:50~ | Lunch |
| 16:40~ | Invited talk 2 K. Kawagishi (NIMS) | 14:40~ | SIP-IMASM 6 (CFRP) G. Fujii (AIST) | 13:00~ | Opening, 西野誠(JST) |
| 17:10~ | Photo | 15:00~ | SIP-IMASM 7 (CFRP) A. Uedono (U.Tsukuba) | 13:10~ | Invite talk 1 藤元伸悦 (樹脂) (新日鉄住金化学) |
| 17:20~ | SIP-IMASM Posters | 15:20~ | SIP-IMASM 8 (Polymer) Y. Harada (AIST) | 13:35~ | SIP-IMASM 1 原田祥久 (樹脂) (AIST) |
| 18:20~ | Banquet | 15:40~ | Coffee | 14:00~ | Invite talk 2 佐藤成道 (CFRP) (東レ) |
| 20:20 | | 16:00~ | SIP-IMASM 9 (CFRP) T. Watanabe (KEK) | 14:25~ | SIP-IMASM 2 木村正雄 (CFRP) (KEK) |
| | | 16:20~ | SIP-IMASM 10 (CFRP) H. Wang (NIMS) | 14:50~ | SIP-IMASM 3 小口かなえ (CFRP) (東京大学) |
| | | 16:40~ | SIP-IMASM 11 (CFRP) M. Kusano (NIMS) | 15:15~ | Coffee |
| | | 17:00~ | SIP-IMASM 12 (CFRP) N. Terasaki (AIST) | 15:30~ | Invite talk 3 福島明 (Ceramic) (MHIAEL) |
| | | | | 15:55~ | SIP-IMASM 4 原徹 (Ceramic) (NIMS) |
| | | | | 16:20~ | Invite talk 4 榎学 (金属) (東京大学) |
| | | | | 16:45~ | SIP-IMASM 5 山崎明義 (金属) (筑波大学) |
| | | | | 17:10~ | SIP-IMASM 6 大久保忠勝 (金属) (NIMS) |
| | | | | 17:35~ | Closing |
| | | | | 17:50 | |

4th Symposium on Innovative Measurement and Analysis for Structural Materials (SIP-IMASM2018)

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【11/13(Tue.)】

11:30 Registration

「Session chair: Paul Fons (AIST)」

13:30 Guest speech Ryo Kuroda (CAO)

Welcome speech Teruo Kishi (MOFA/SIP-SM⁴I PD)

Introduction Masataka Ohkubo (AIST)

"Welcome to SIP-IMASM 2018"

14:00 **Keynote 1** Oded Sobol (BAM)

"BAM's role in materials science and hydrogen in metals: TOF-SIMS imaging"

14:50 IMASM-1 Akiyoshi Yamasaki (U.Tsukuba)

"Direct Detection and Mapping of Hydrogen in Structural Materials Using Ion Microbeams"

15:10 Talk 1 Afshin Yousefi (Ibaraki U.)

"Experimental Study of Hydrogen Embrittlement in Duplex Stainless Steel"

15:30 **Coffee Break**

「Session chair: Masataka Ohkubo (AIST)」

15:50 **Invited 1** Nobuyuki Ishikawa (JFE steel)

"Corrosion and Hydrogen Monitoring Techniques and Application to Steel Research"

16:20 IMASM-2 Paul Fons (AIST)

"XAFS Measurements of Nitrogen in 9%Cr high-temperature Steel Alloys: Dissolved Nitrogen and VN Nanoprecipitates"

16:40 **Invited 2** Kyoko Kawagishi (NIMS)

"Development of Ni-base Superalloys for Gas Turbine Applications"

17:10 Photo

17:20 Poster session

18:20 **Banquet**

【11/14(Wed.)】

「Session chair: Hiroaki Mamiya (NIMS)」

- 09:30 **Keynote 2** Remko Akkerman (U.Twente) "Processing and properties of thermoplastic composite materials"
- 10:20 **Invited 3** Narumichi Sato (Toray) "Development of Out-of-Autoclave (OoA) moulding technologies for aircraft composite structure"

10:50 **Coffee Break**

- 11:10 IMASM-3 Masataka Ohkubo (AIST) "X-ray absorption spectroscopy on chemical reaction of impurity oxygen and nitrogen with thermoplastic resins of PPS and PEEK"
- 11:30 IMASM-4 Masao Kimura (KEK) "*In situ* observation of crack initiation and propagation in CFRP using a newly-developed XAFS-CT"

11:50 **Lunch**

「Session chair: Tadakatsu Ohkubo (NIMS)」

- 13:30 **Keynote 3** Matthew Collins (Airbus) "Use of composite materials in Airbus aircraft and meeting the environmental challenges"
- 14:20 IMASM-5 Manabu Tezura (U.Tsukuba) "Development of *In Situ* Transmission Electron Microscopy for CFRP and High-Temperature Materials at the University of Tsukuba"
- 14:40 IMASM-6 Go Fujii (AIST) "Chemical state imaging of CFRP with X-ray emission spectroscopy"
- 15:00 IMASM-7 Akira Uedono (U.Tsukuba) "Free Volume Properties in Epoxy Resins for CFRP Probed by Positron Annihilation"
- 15:20 IMASM-8 Yoshihisa Harada (AIST) "Evaluation for Fatigue Damage in Epoxy Polymer by Positron Annihilation"

15:40 **Coffee Break**

「Session chair: Akira Uedono (U.Tsukuba)」

- 16:00 IMASM-9 Toshiki Watanabe (KEK) "Nano mechanical testing for in situ X-CT observation of CFRP"
- 16:20 IMASM-10 Hongxin Wang (NIMS) "Nanometric In-situ Stress Mapping Reveals Why Brittle Carbon Fiber Becomes Tough in a Polymer Composite"
- 16:40 IMASM-11 Masahiro Kusano (NIMS) "Mid-IR laser ultrasonic testing for delamination in L-shaped CFRPs"
- 17:00 IMASM-12 Nao Terasaki (AIST) "Mechanoluminescent Visualization on portent and process of destruction on CFRP structural material"

【11/15(Thu.)】

「Session chair: Masao Kimura (KEK)」

- 09:00 **Keynote 4** Paul Zaslansky (Charité) "Bio-inspired lessons for innovative structural materials from 500 million years of tooth evolution"
- 09:50 **Invited 4** Naoe Hosoda (NIMS) "Biological adhesion"
- 10:20 **Coffee Break**
- 10:40 IMASM-13 Yasuo Takeichi (KEK) "Chemical State Mapping of Barrier Coating Using a Newly-Developed XAFS-CT"
- 11:00 IMASM-14 Hiroaki Mamiya (NIMS) "Quantitative Analysis of Nanostructures in Advanced Heat Resistant Alloys"
- 11:20 IMASM-15 Shien Ri (AIST) "Moiré Imaging Technique for Displacement and Strain Measurement from Nano to Mega Scales "
- 11:40 **Closing**

11:50 **Lunch**

国内連携会議

13:00 **Opening** 西野誠 (JST)

「Session chair: 大久保雅隆 (AIST)」

- 13:10 **Invited 1** 藤元伸悦 (新日鉄住金化学) "CFRP 用分子設計"
- 13:35 IMASM-1 原田祥久 (AIST) "構造用高分子材料の陽電子消滅を用いた疲労損傷評価"
- 14:00 **Invited 2** 佐藤成道 (東レ) "航空機向け CFRP における脱オートクレーブ成形技術の開発"
- 14:25 IMASM-2 木村正雄 (KEK) "放射光/X線-CTによる CFRP のき裂進展のマルチスケール観察"
- 14:50 IMASM-3 小口かなえ (東京大学) "L型 CFRP 部材での中赤外レーザー超音波試験シミュレーション"

15:15 **Coffee Break**

- 15:30 **Invited 3** 福島明 (MHIAEL) "酸化物系軽量耐熱部材開発と先端計測"
- 15:55 IMASM-4 原徹 (NIMS) "先進材料の微細組織を三次元で詳細に評価する"
- 16:20 **Invited 4** 榎学 (東京大学) "マテリアルインテグレーションシステムによる溶接部の疲労性能予測"
- 16:45 IMASM-5 山崎明義 (筑波大学) "集束イオンビームを用いた構造材料中の水素分析 ～手法と測定例～"
- 17:10 IMASM-6 大久保忠勝 (NIMS) "レーザーアトムプローブによるナノ組織解析"
- 17:35 **Closing**

Poster presentation of the SIM-IMASM team 【11/13(Tue)】

CFRP & Polymer

- P1-1 Tatsuhiro Ishikawa (U. Tsukuba) "*In Situ* Transmission Electron Microscopy of Fracture in Carbon Fiber Reinforced Plastics"
- P1-2 Kaoru Sako (U. Tsukuba) "Free Volume in CFRP After Tensile Test probed by positron annihilation"
- P1-3 Wataru Ueno (U. Tsukuba) "Temperature Dependence of Free Volumes in Bisphenol A with Carbon Fiber Studied by Positron Lifetime Spectroscopy"
- P1-4 Qinghua Wang (AIST) "Full-field Strain Imaging in CFRP by Moiré Phase Analysis"
- P1-5 Tomohiro Ishii (KEK) "*In Situ* Observation of Crack Initiation and Propagation in CFRP using X-CT"
- P1-6 Hongxin Wang (NIMS) "Stable Fracture Growth in a Brittle Carbon Fiber Revealed by Nanoscale Stress Mapping using a Scanning Probe"
- P1-7 Hongxin Wang (NIMS) "Modulus hardening of carbon fiber and its application in non-destructive stress sensing for CFRP"
- P1-8 Hisashi Yamawaki (NIMS) "Detection of delamination in CFRP plate using ultrasonic visualization technique(2nd)"
- P1-9 Kimiyoshi Naito (NIMS) "Raman Spectroscopy of Carbon Fibers"
- P1-10 Kanae Oguchi (U. Tokyo) "Numerical Simulation of Mid-IR Ultrasound Testing in L-shape CFRP"

Metals

- P2-1 Akiyoshi Yamasaki (U.Tsukuba) "Three-Dimensional Imaging of Hydrogen in Structural Materials by Transmission ERDA "
- P2-2 Takashi Nagoshi (AIST) "Fatigue Damage Analysis on Titanium Alloy by using EBSD and Positron Annihilation"
- P2-3 Brian E. O'Rourke (AIST) "Positron annihilation study of defects induced by fatigue in stainless steel at 26°C and 550°C"
- P2-4 Shoji Ishibashi (AIST) "Theoretical calculation of positron-vacancy interaction for materials science"
- P2-5 Hajime Kishimoto (U.Tsukuba) "Cyclic Deformation Behavior of Titanium Alloy by Using Micro-Testing Method"
- P2-6 Yasuhiro Niwa (KEK) "Dynamic observation of fracture of metals using Time-resolved dispersive XAFS"
- P2-7 Taisuke Sasaki (NIMS) "Application of Laser-assisted 3DAP to structural materials"

Ceramics & Coating

- P3-1 Toru Hara (NIMS) "Three-Dimensional Structural Study of Microstructures in Advanced Materials"
- P3-2 Kenichi Kimijima (KEK) "Development of *in situ* XAFS/XRD simultaneous measurement of barrier coating up to 1500°C"
- P3-3 Kimiyoshi Naito (NIMS) "Raman Spectroscopy for In-Situ Tensile Testing of Alumina Fibers"

Measurement

- P4-1 Kimikazu Sasa (U. Tsukuba) "Accelerator Facilities for Ion Beam Analysis of Structural Materials"
- P4-2 Koichi Murakami (U. Tsukuba) "Development of 4000 K-Class High-Temperature *In Situ* Transmission Electron Microscopy: Production of Laser Heating Unit"
- P4-3 Takuya Okamoto (U. Tsukuba) "Development of High-Temperature Deformation *In Situ* Transmission Electron Microscopy"
- P4-4 Naoki Uemura (U. Tsukuba) "Development of 4000K-Class High-Temperature *In Situ* Transmission Electron Microscopy: Application to High-Temperature Materials"
- P4-5 Keiichi Hirano (KEK) "X-ray Analyzer-based Phase-Contrastcomputed Laminography III"
- P4-6 Toshio Hyodo (KEK) "Pulse Stretching System for Materials at KEK Slow Positron Facility"
- P4-7 Masao Kimura (KEK) "Non-empirical identification of trigger sites in crack-formation during heterogeneous reduction of iron-ore sinters using persistent homology"
- P4-8 Hiroaki Mamiya (NIMS) "Multiscale Structural Characterization Comprehensively using Multiprobes for Aerospace Materials"