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Japan Society of Mechanical Engineers / Materials and Mechanics Division

2010 M&M International Symposium for Young Researchers

日本機械学会 材料力学部門 2010M&M 若手研究者のための国際シンポジウム

March 1-3, 2010, California Institute of Technology(Caltech), Pasadena, CA, USA

Final Program

Tuesday, March 2, 2010

8:15 – 9:00: Registration & Refreshments

Room I (101 Guggenheim)

9:00 – 9:10: Opening Address

Jun KOMOTORI (Keio Univ.)

Guruswami RAVICHANDRAN (Caltech)

9:10 – 9:50: Plenary Lecture

Chair: Takahide SAKAGAMI (Kobe Univ.)

A research path: From fracture mechanics to inverse problems

Shiro KUBO (Osaka Univ.)

9:50 – 10:20: Coffee Break

10:20 – 11:40: Session (I), Composites

Chair: Kazuto TANAKA (Doshisha Univ.)

- 101 Elastic properties of green composites reinforced with ramie twisted yarn
Rie NAKAMURA (Cornell Univ.), Koichi GODA, Junji NODA (Yamaguchi Univ.), Anil NETRAVALI (Cornell Univ.)
- 102 High Accurate Space Telescope Mirror Made by Light and Thermally Stable CFRP
Jun KOYANAGI (JAXA), Yoshihiko ARAO (Waseda Univ.), Shin UTSUNOMIYA, Shin-ichi TAKEDA (JAXA), Hiroyuki KAWADA (Waseda Univ.)
- 103 Residual stress relaxation in CFRP cross-ply laminate
Yoshihiko ARAO (Waseda Univ.), Jun KOYANAGI(JAXA), Yukie OKUDOI, Masanori OTSUKA, Hiroyuki KAWADA (Waseda Univ.)
- 104 Strength Degradation Mechanism of Woven GFRP under Water Environment
Masahiro KOTANI, Yusuke YASUFUKU, Yusuke TAMAISHI, Hiroyuki KAWADA (Waseda Univ.)

11:40 – 13:00: Lunch

13:00 – 13:40: Plenary Lecture

Chair: Kikuo KISHIMOTO (Tokyo Tech.)

Microstructural Modeling of Failure at Different Physical Scales

Mohammed ZIKRY (North Carolina State Univ.)

13:40 – 13:50: Break

13:50 – 15:10: Session (III), Advanced Materials 1

Chair: **Julia R. GREER** (Caltech), **Yoshinobu SHIMAMURA** (Shizuoka Univ.)

- 301 Nano-twinning metals: synthesis, characterization and mechanical behavior
Andrea HODGE (Univ. Southern California)
- 302 Microscopic Structure Control of Carbon Nanofiller/Epoxy Composite by Using AC Electrical Field and the Effect on Physical Properties
Yoshinobu SHIMAMURA (Shizuoka Univ.), **Toshihiro CHIBA** (Toho Tenax), **Naoki OKUDA** (Toray Industries), **Keiichiro TOHGO** (Shizuoka Univ.)
- 303 Size Matters: In-situ Investigation of Mechanical Properties at the Nano-scale
Julia R. GREER (Caltech)
- 304 Fabrication and Strength Evaluation of Biocompatible Ceramic-Metal Composite Materials
Tomoyuki FUJII, **Keiichiro TOHGO**, **Hiroyasu ARAKI** (Shizuoka Univ.), **Katsunori WAKAZONO** (INAX Corp.), **Masaki ISHIKURA**, **Yoshinobu SHIMAMURA** (Shizuoka Univ.)

15:10 – 15:40: Coffee Break

15:40 – 17:00: Session (V), Advanced Materials 2

Chair: **Noriyuki HISAMORI** (Sophia Univ.)

- 501 Development of New Biocompatible MgSiO₃ Piezoelectric Thin Films
Hwisim HWANG (Doshisha Univ.), **Yasutomo UETSUJI** (Osaka Institute of Tech.), **Kazuto TANAKA**, **Tsutao KATAYAMA**, **Eiji NAKAMACHI** (Doshisha Univ.)
- 502 High Performance of Tribological Components by SRIQ/DLC Hybrid Surface Modification
Noriyoshi TAKAOKA (Ibaraki Univ.), **Yoshitaka MISAKA**, **Kazuhiro KAWASAKI** (NETUREN), **Hideto SUZUKI** (Ibaraki Univ.)
- 503 Generation and control of sound bullets with nonlinear dynamic materials
Chiara DARAIO (Caltech)

Room II (202 Guggenheim)

10:20 – 11:40: Session (II), Modeling and Simulation 1

Chair: **Shigenobu OGATA** (Osaka Univ.)

- 201 An Effective Interaction Potential Model of Stress- and Temperature-Induced Martensitic Transformations in Perfect Bi-Atomic Crystals
Ryan ELLIOTT (Univ. of Minnesota)
- 202 Analysis of atomistic instability mode in thin films under tension
Yoshitaka UMENO (Univ. of Tokyo)
- 203 Local Lattice Instability Analysis on Amorphous Metals: Switching between Stable and Unstable Atoms
Masaomi NISHIMURA (Shinshu Univ.), **Kisaragi YASHIRO** (Kobe Univ.), **Masahiro ARAI** (Shinshu Univ.)
- 204 Quantum Chemical Molecular Dynamics Study of Chemical Reaction Dynamics on Ni-base Alloy Surfaces in Gas-cooled Reactors
Ken SUZUKI, **Yoichi TAKEDA**, **Hideo MIURA** (Tohoku Univ.)

11:40 – 13:00: Lunch

13:50 – 15:10: Session (IV), Modeling and Simulation 2

Chair: **Prashant PUROHIT** (Univ. of Pennsylvania), **Tetsuya MATSUDA** (Univ. of Tsukuba)

- 401 Cavitation in Soft Solids: A Realizable Homogenization Approach
Oscar LOPEZ-PAMIES (SUNY Stony Brook)
- 402 Multi-Scale Creep Analysis of Angle-Ply CFRP Laminates Based on a Homogenization Theory
Tetsuya MATSUDA, **Yuichi FUKUTA** (Univ. of Tsukuba)
- 403 Phase Field Modeling of Interactive Evolution of Dislocation and Hydrogen Density Fields in Iron
Hideki MORI, **Hajime KIMIZUKA** and **Shigenobu OGATA** (Osaka Univ.)
- 404 Unusual mechanical response of fibrin networks is a result of protein unfolding
Prashant PUROHIT (Univ. of Pennsylvania)

15:10 – 15:40: Coffee Break

15:40 – 17:00: Session (VI), Modeling and Simulation 3

Chair: **Dai OKUMURA** (Univ. of Pennsylvania), **Adrian LEW** (Stanford Univ.)

- 601 Surface-Roughness-Induced hysteresis in adhesive elastic contacts
Adrian LEW (Stanford Univ.)
- 602 DFT-Based FEM Study on Nonlinear and Anisotropic Behavior of Indented Single-Crystal Diamond
Hajime KIMIZUKA (Osaka Univ.), **Naohiro TODA** (Sumitomo Electric Hardmetal), **Shigenobu OGATA** (Osaka Univ.)
- 603 Implicit Iterative Finite Element Scheme for Strain Gradient Crystal Plasticity Model Based on Self-Energy of GNDs
Ryushin KAMETANI, **Kazuki KODERA**, **Dai OKUMURA**, **Nobutada OHNO** (Nagoya Univ.)
- 604 Impact Generated Elastic-Plastic StressWaves and Coupled Fluid-Structure Response
Kazuaki INABA (Tokyo Tech.) and **Joseph E. SHEPHERD** (Caltech)

18:00 : Banquet at Athenaeum

Wednesday, March 3, 2010

Room I (101 Guggenheim)

9:20 – 10:00: Plenary Lecture

Chair: **Hirotsugu INOUE** (Tokyo Tech.)

Fracture Nano-mechanics
Takayuki KITAMURA (Kyoto Univ.)

10:00 – 10:10: Break

10:10 – 11:30: Session (VII), Advanced Materials 3

Chair: **Hidemitsu FURUKAWA** (Yamagata Univ.), **Antonia ANTONIOU** (Georgia Tech.)

- 701 Synthesis and mechanical behavior of Nanoporous Platinum
Antonia ANTONIOU (Georgia Tech.)
- 702 Nondestructive Detection of Defects in GFRP Laminates by Microwaves
Atsushi HOSOI, Yang JU (Nagoya Univ.)
- 703 High-Strength Gels Studied with Scanning Microscopic Light Scattering
Hidemitsu FURUKAWA (Yamagata Univ.)
- 704 A Novel Meshfree Method for Large Deformation Analysis of Elastic and Viscoelastic Bodies without using Background Cells
Yuki ONISHI, Kenji AMAYA (Tokyo Tech.)

11:30 – 13:00: Lunch at Dabney

13:00 – 14:00: Session (IX), Advanced Materials 4

Chair: **Yu KUROKWA** (Tokyo Tech.), **Henry SODANO** (Arizona State Univ.)

- 901 Piezoelectric Nanowire Interface for Increased Strength and Multifunctionality
Henry SODANO (Arizona State Univ.)
- 902 Development of Flaw Visualization Technique at Near Field of Phased Array Probe
Yu KUROKWA (Tokyo Tech.)
- 903 Investigation on the corrosion behavior of Co-Cr alloys worn by the different scratching rate
Masayoshi MIZUTANI (RIKEN), Noriyuki HISAMORI, Shou ATSUTA, Takafumi MIZUNO (Sophia Univ.), Hitoshi OHMORI (RIKEN)

14:00 – 14:30: Coffee Break

14:30 – 15:10: Plenary Lecture

Chair: **Toshio NAKAMURA** (SUNY Stony Brook)

Intersonic Earthquakes: What Can Mechanics and Laboratory Earthquakes Teach us About Real Ones
Ares ROSAKIS (Caltech)

15:10 – 15:20: Closing Address

Toshio NAKAMURA (SUNY Stony Brook)
Takahide SAKAGAMI (Kobe Univ.)

Room II (202 Guggenheim)

10:10 – 11:30: Session (VIII), Fatigue and Creep

Chair: **Masanobu KUBOTA** (Kyushu Univ.), **Daiki SHIOZAWA** (Kobe Univ.)

- 801 Effect of hydrogen absorption on the fatigue strength reduction caused by multiple overloads in notched component
Masanobu KUBOTA, Toru SAKUMA, Junichiro YAMAGUCHI, Yoshiyuki KONDO (Kyushu Univ.)
- 802 Effect of Surface Texture and Humidity Environment on High Cycle Fatigue Property of Wrought Magnesium Alloys AZ31 and AZ61
Toshifumi KAKIUCHI (Gifu Univ.), Yasuo OCHI, Kenta TANAKA, Takashi MATSUMURA (Univ. of Electro-Communications)
- 803 Observation of Crack Propagation Under Reversed Torsion Fatigue Tests by μ CT imaging using Synchrotron Radiation
Daiki Shiozawa, Yoshikazu Nakai and Motonobu Murakami (Kobe Univ.)
- 804 Effect of Plastic Pre-Straining on Microstructural Changes in Ni-base Single Crystal Superalloy Induced by Creep Stress
Motoki SAKAGUCHI, Momoko IKE, Masakazu OKAZAKI (Nagaoka Univ. of Tech.)

11:30 – 13:00: Lunch

13:00 – 14:00: Session (X), Engineering Applications

Chair: **NAOKO ISHIZUKA** (IHI), **Hiroaki ITO** (Shinshu Univ.)

- 1001 Effect of Hardness Ratio on Plastic Dissipation during Fine Particle Peening
Masaki OMIYA, Shoichi KIKUCHI, Yo Hirota, Jun KOMOTORI (Keio Univ.)
- 1002 Numerical Simulation and Press Molding of Glass Micro Devices
Hiroaki ITO, Masahiro ARAI, Tsutomu KODERA, Tomohiro INO (Shinshu Univ.), Manabu YASUI (Kanagawa Industrial Technology Center) and Masaharu TAKAHASHI(AIST)
- 1003 Analysis on the stability of glass sheets in air conveyor systems
Naoko ISHIZUKA, Takahiro SHIMADA, Mami YOKOHAMA, Kensuke HIRATA (IHI)