

Session Program

	Room 1	Room 2	Room 3
<i>12 Sep. 2018 Wednesday</i>			
9:00 - 9:15	Opening Ceremony (Plenary Hall)		
9:15 - 10:00	Plenary Talk 1: Dr. Jun Akedo (Plenary Hall)		
10:00 - 10:30	Poster Shotgun Presentations (P1) (Plenary Hall)		
10:40 - 10:45	Break		
10:45 - 12:00	W1A1 New Energy Technology 1	W2A1 Piezoelectric Actuators and Transformers 1	W3A1 Smart Structures and Systems 1
12:00 - 13:30	Lunch		
13:30 - 15:00	W1P1 Sustainability Technology 1	W2P1 Piezoelectric Actuators and Transformers 2	W3P1 New Energy Technology 2
15:00 - 15:40	Poster Presentations (P1) (Exhibition Hall)		
15:40 - 16:55	W1P2 Smart Materials Applications	W2P2 Piezoelectric Actuators and Transformers 3	W3P2 New Energy Technology 3
<i>13 Sep. 2018 Thursday</i>			
9:00 - 9:45	Plenary Talk 2: Prof. Hirotsugu Ogi (Plenary Hall)		
9:45 - 10:15	Poster Shotgun Presentations (P2) (Plenary Hall)		
10:15 - 10:55	Poster Presentations (P2) (Exhibition Hall)		
10:55 - 12:25	T1A1 Smart Structures and Systems 2	T2A1 MEMS Sensors and Actuators 1	T3A1 Ultrasonic Technologies 1
<i>14 Sep. 2018 Friday</i>			
9:00 - 9:45	Plenary Talk 3: Prof. James Friend (Plenary Hall)		
9:45 - 10:15	Poster Shotgun Presentations (P3) (Plenary Hall)		
10:15 - 10:30	Break		
10:30 - 12:00	F1A1 Sustainability Technology 2	F2A1 Piezoelectric Actuator Applications	F3A1 Ultrasonic Technologies 2
12:00 - 13:30	Lunch		
13:30 - 15:00	F1P1 Ultrasonic Technologies 3	F2P1 MEMS Sensors and Actuators 2	F3P1 Piezoelectric Materials and Manufacturing Processes
15:00 - 15:40	Poster Presentations (P3) (Exhibition Hall)		
15:40 - 16:40	F1P2 Smart Structures and Systems 3		F3P2 Materials Characterization Methods
16:40 - 17:00	Closing Ceremony		

12 Sep. 2018 Wednesday, 9:15 - 10:00

Chairperson: Takeshi Morita (The University of Tokyo)

Plenary Hall

Plenary Talk 1

PT1 (9:15 - 10:00)

1

Ceramic Thick Film Fabrication by Aerosol Deposition and the Application to Piezoelectric Devices

Jun Akedo (National Institute of Advanced Industrial Science and Technology)

13 Sep. 2018 Thursday, 9:00 - 9:45

Chairperson: Isaku Kanno (Kobe University)

Plenary Hall

Plenary Talk 2

PT2 (9:00 - 9:45)

2

Progress in Wireless-Electrodeless MEMS Quartz-Crystal-Microbalance Biosensor

Hirotsugu Ogi (Osaka University)

14 Sep. 2018 Friday, 9:00 - 9:45

Chairperson: Masaya Takasaki (Saitama University)

Plenary Hall

Plenary Talk 3

PT3 (9:00 - 9:45)

3

Nanoscale Acoustofluidics

James Friend (University of California San Diego)

12 Sep. 2018 Wednesday, 10:45 - 12:00

Chairperson: Daeyong Jeong (Inha University)

Room 1

W1A1 New Energy Technology 1

W1A1-1 (10:45 - 11:00)

4

A Piezoelectric Stack Harvester with Multiple Close Fundamental Mode

Erwin Mazwardi, Tien-Fu Lu (University of Adelaide)

W1A1-2 (11:00 - 11:15)

94

Nonlinear elastic constants measurements for various piezoelectric materials

Susumu Miyake¹, Takashi Kasashima², Masato Yamazaki², Yasuyuki Okimura², Hajime Nagata³, Takeshi Morita¹ (1The University of Tokyo, 2NGK SPARK PLUG Co., Ltd., 3Tokyo University of Science)

W1A1-3 (11:15 - 11:30)

6

Vibration based Piezoelectric-Electromagnetic Hybrid Energy Harvester for Autonomous Sensor Systems

Inki Jung^{1,2}, Jaehoon Choi^{1,2}, Chong-Yun Kang^{1,2} (1Korea University, 2Korea Institute of Science and Technology)

W1A1-4 (11:30 - 11:45)

7

Energy Harvesting from AC Power Line using Piezoelectric and Permanent Magnet

Kyohei Izumi¹, Masaaki Aramaki¹, Takeshi Yoshimura¹, Syuichi Murakami², Yusuke Kanaoka², Yusuke Sandoh², Kazuo Satoh², Norifumi Fujimura¹ (1Osaka Prefecture University, 2Osaka Research Institute of Industrial Science and Technology)

W1A1-5 (11:45 - 12:00)

8

Temperature dependences of the electromechanical and electrocaloric properties of PLZT ceramics

Hiroshi Maiwa (Shonan Institute of Technology)

12 Sep. 2018 Wednesday, 13:30 - 15:00

Chairperson: Jens Twiefel (Leibniz Universitaet Hannoer)

Room 1

W1P1 Sustainability Technology 1

W1P1-1 (13:30 - 14:00)

9

[Cancelled] Pseudocubic-based polymorphic phase boundary structures and their effect on the piezoelectric properties of (Na,K)NbO₃-based lead-free ceramics

Ku-Tak Lee, Dae-Hyeon Kim, Sung-Hoon Cho, Sahn Nahm (Korea University)

W1P1-2 (14:00 - 14:15)

10

The polymorphic phase boundary structure and enhanced piezoelectric properties of (Li_xNa_{0.5-x}K_{0.5})(Nb_{1-y}Sb_y)O₃-CaZrO₃ Piezoelectric Ceramics

Ku-Tak Lee, Dae-Hyeon Kim, Sahn Nahm (Korea University)

W1P1-3 (14:15 - 14:30)

11

Resistive switching and Synaptic properties of NaNbO₃ thin film grown on TiN/SiO₂/Si substrate for artificial synapse

Jong-Un Woo, Hyun-Gyn Hwang, Sung-Mean Park, Sahn Nahm (Korea University)

W1P1-4 (14:30 - 14:45)

12

Implementation of Biological Synaptic Functions in Amorphous Ta₂O₅ Memristor

Hyun-Gyu Hwang¹, Tae-Ho Lee¹, Jong-Un Woo¹, Tae-Gon Lee¹, SeongHoon Jang¹, Gunuk Wang¹, Tae-Wook Kim², Chong-Yun Kang^{1,3}, Sahn Nahm¹ (1Korea University, 2KIST Jeonbuk Institute of Advanced Composite Materials, 3Korea Institute of Science and Technology (K

W1P1-5 (14:45 - 15:00)

13

Effect of green sheet thickness and application of pressure on a compact during sintering in <110>-oriented 0.85(Bi_{0.5}Na_{0.5})TiO₃-0.15BaTiO₃ ceramics

Ichiro Fujii¹, Ryo Itou¹, Kosuke Kawachi¹, Shintaro Ueno¹, Tohru S. Suzuki², Satoshi Wada¹ (1University of Yamanashi, 2National Institute for Materials Science)

12 Sep. 2018 Wednesday, 15:40 - 16:55

Chairperson: Chong-Yun Kang (KIST)

Room 1

W1P2 Smart Materials Applications

W1P2-1 (15:40 - 15:55)

14

Miniature magnetostrictive vibrational power switch for battery-less radio transmission module

Naruto Kaichi, Toshiyuki Ueno (Kanazawa University)

W1P2-2 (15:55 - 16:10)

15

Magnetostrictive vibrational power generation device using shock force for battery-less LPWA long distance wireless sensor system

Yusuke Mori, Toshiyuki Ueno (Kanazawa University)

W1P2-3 (16:10 - 16:25)

16

A McKibben artificial muscle with variable contraction characteristics by SMP material

Shigeyoshi Yahara, Shuichi Wakimoto, Takefumi Kanda (Okayama University)

W1P2-4 (16:25 - 16:40)

17

Long-range linear actuator using SMA wires

Kenta Suzuki¹, Hikaru Umino², Akihiko Houda², Takeshi Morita¹ (1The University of Tokyo, 2ORIENTAL MOTOR CO., LTD.)

W1P2-5 (16:40 - 16:55)

18

Lithium Alloy based Electrochemical Actuators

Sangtae Kim¹, Myoung-Sub Noh^{1,2}, Seung-Hyub Baek¹, Chong-Yun Kang^{1,2} (1Korea Institute of Science and Technology, 2Korea University)

12 Sep. 2018 Wednesday, 10:45 - 12:00

Chairperson: Hu Huang (Jilin University)

Room 2

W2A1 Piezoelectric Actuators and Transformers 1

W2A1-1 (10:45 - 11:00)

19

A novel disc-type rotary ultrasonic motor driven by low voltage

Xin Hong¹, Ying Yang¹, Jianming Qiu¹, Piotr Vasiljev², Sergejus Borodinas², Dalius Mazeika³ (1Nanjing University of Aeronautics and Astronautics, 2Lithuanian University of Educational Sciences, 3Vilnius Gediminas Technical University)

W2A1-2 (11:00 - 11:15)

20

Modeling and control of a V-shaped linear ultrasonic motor

Xiaoni Li, Zhiyuan Yao, Dawei Wu (Nanjing University of Aeronautics and Astronautics)

W2A1-3 (11:15 - 11:30)

21

Dynamic Energy Efficient Preload Control for Rotary Ultrasonic Motors

Abdullah Mustafa, Takeshi Morita (The University of Tokyo)

W2A1-4 (11:30 - 11:45)

22

Development of a Hollow-Type Ultrasonic Motor with a Cylinder-Shaped Rotor

Jinyan Chen, Nan Wang, Chao Chen (Nanjing University of Aeronautics and Astronautics)

W2A1-5 (11:45 - 12:00)

23

Variable simulated inductor for the resonant frequency control of the ultrasonic transducer

Hiroki Yokozawa¹, Jens Twiefel², Michael Weinstein², Takeshi Morita¹ (1The University of Tokyo, 2Leibniz University Hannover)

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Chairperson: Goon Tan (Kobe University)

Room 2

W2P1 Piezoelectric Actuators and Transformers 2

W2P1-1 (13:30 - 13:45)

24

Research on Drive and Control with low speed of Traveling Wave Ultrasonic Motor

Weijun Zeng, Song Pan, Lin Yang, Chunsheng Zhao (Nanjing University of Aeronautics and Astronautics)

W2P1-2 (13:45 - 14:00)

25

High transfer efficiency ultrasonic motors

Gai Zhao, Xiaoliang Liu, Jingfu Song, Qingjun Ding, Jinhao Qiu (Nanjing University of Aeronautics and Astronautics)

W2P1-3 (14:00 - 14:15)

26

Research on the large-stroke Piezoelectric Actuators based on the Parasitic Motion of Asymmetric Flexure Hinges

Jianping Li¹, Hu Huang², Jianming Wen¹ (1Zhejiang Normal University, 2Jilin University)

W2P1-4 (14:15 - 14:30)

27

Design optimization of double ring rotary type ultrasonic motor

Sergejus Borodinas¹, Piotr Vasiljev², Dalius Mazeika¹, Regimantas Bareikis², Ying Yang³ (1Vilnius Gediminas Technical University, 2Lithuanian University of Educational Sciences, 3Nanjing University of Aeronautics and Astronautics)

W2P1-5 (14:30 - 14:45)

28

[Cancelled] A Novel Joint Mechanism Driven by Patched Piezoelectric Actuators

Zi-long YE, Jia-mei JIN, Peng-peng YU (Nanjing University of Aeronautics and Astronautics)

W2P1-6 (14:45 - 15:00)

29

Design and development of a triangle type piezostack actuator

Jianmin Qiu¹, Yin Yang¹, Jiamei Jin¹, Dalius Mazeika², Yiping Wang¹, Pitor Vasiljev³ (1Nanjing University of Aeronautics and Astronautics, 2Vilnius Gediminas Technical University, 3Vilnius Pedagogical University)

12 Sep. 2018 Wednesday, 15:40 - 16:55

Chairperson: Shashank Priya (The Penn State University)

Room 2

W2P2 Piezoelectric Actuators and Transformers 3

W2P2-1 (15:40 - 15:55)

30

Micro Linear Ultrasonic Motor

Shunsuke Izuhara, Tomoaki Mashimo (Toyohashi University of Technology)

W2P2-2 (15:55 - 16:10)

31

Fundamental Study on Miniature Ultrasonic Linear Motor Capable of Applying Opposing Preload

Yutaro Tanoue, Takeshi Morita (The University of Tokyo)

W2P2-3 (16:10 - 16:25)

32

A Piezoelectric-driven Stick-slip Linear Actuator Using L-shaped Flexure Hinge Mechanism

Zhi Xu, Jingshi Dong, Hu Huang, Zunqiang Fan, Hongwei Zhao (Jilin University)

W2P2-4 (16:25 - 16:40)

33

A Novel Piezoelectric Inertial Actuator using MRF Control Technology

Renming Wang, Jianming Wen, Dan Lei (Zhejiang Normal University)

W2P2-5 (16:40 - 16:55)

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Theoretical modeling of inertial piezoelectric actuators

Kang Chen, Jianming Wen (Zhejiang Normal University)

12 Sep. 2018 Wednesday, 10:45 - 12:00

Chairperson: Yung-Tien Liu (National Kaohsiung University of Science and Technology)

Room 3

W3A1 Smart Structures and Systems 1

W3A1-1 (10:45 - 11:15)

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Piezoelectric Devices for Crisis Technologies -IEEE UFFC Distinguished Lecture-
Kenji Uchino (The Penn State University)

W3A1-2 (11:15 - 11:45)

36

Several flexible oxide ferroelectric films and their applications
Guoliang Yuan (Nanjing University of Science and Technology)

W3A1-3 (11:45 - 12:00)

128

Doping effect of lead-free $K_{0.5}Na_{0.5}NbO_3$ thin films by multi-target RF-magnetron sputtering
Shintaro Nishioka, Goon Tan, Toshihito Umegaki, Isaku Kanno (Kobe University)

12 Sep. 2018 Wednesday, 13:30 - 15:00

Chairperson: Tien-Fu Lu (University of Adelaide)

Room 3

W3P1 New Energy Technology 2

W3P1-1 (13:30 - 14:00)

38

Energy-efficient orbit jump technique for energy harvesting using nonlinear mechanical systems

Mickaël Lallart¹, Linjuan Yan¹, Amin Karami² (1Univ. Lyon, INSA-Lyon 2State University of New York at Buffalo)

W3P1-2 (14:00 - 14:30)

39

Piezoelectric Polymer-based Roadway Energy Harvesting via Displacement Amplifier Module to Realize the Self-Powered Green Roadways

Inki Jung^{1,2}, Youn-Hwan Shin^{1,2}, Sangtae Kim², Chong-Yun Kang^{1,2} (1Korea University, 2Korea Institute of Science and Technology)

W3P1-3 (14:30 - 14:45)

40

Exact distributed-parameter analysis of piezoelectricity dependence on the resonance output power of a piezoelectric bimorph cantilever energy harvester

Minoru Kuribayashi Kurosawa, Yuichiro Orino, Yoshiharu Ito, Hiroshi Funakubo (Tokyo Institute of Technology)

W3P1-4 (14:45 - 15:00)

41

Automatic Resonance Tuning Mechanism for Piezoelectric Energy Harvesting through Actuating Behavior of Mobile Proof Mass

Youn-Hwan Shin^{1,2}, Chong-Yun Kang^{1,2}, Hyun-Cheol Song¹ (1Korea Institute of Science and Technology, 2 Korea University)

12 Sep. 2018 Wednesday, 15:40 - 16:55

Chairperson: Jianping Li (Zhejiang Normal University)

Room 3

W3P2 New Energy Technology 3

W3P2-1 (15:40 - 16:10)

42

Energy Harvesting from Kinetic and RF Energy for Wireless Sensors

Said F. Al-Sarawi, Menghan Sun, Cuong C. Nguyen (The University of Adelaide)

W3P2-2 (16:10 - 16:40)

43

Piezoelectric Cantilever Array for Wideband Energy Harvesting: Theory and Practical Implementation

Elie Lefeuvre¹, Alexis Brenes¹, Seonho Seok¹, Chan-Sei Yoo² (1Univ. Paris Sud - CNRS, Université Paris-Saclay, 2Korea Electronics Technology Institute)

W3P2-3 (16:40 - 16:55)

44

High energy density ceramic-PVDF ferroelectric polymer 1-3 composite for high energy storage properties

Ji-Ho Lim¹, Jin-Woo Kim¹, Jungho Ryu², Dae-Yong Jeong¹ (1Inha University, 2Yeungnam University)

13 Sep. 2018 Thursday, 10:55 - 12:25

Chairperson: LU Xiaolong (Nanjing University of Aeronautics and Astronautics)

Room 1	T1A1 Smart Structures and Systems 2
T1A1-1 (10:55 - 11:10)	45
A Piezoelectric Finger for Dexterous Robot Hand	
<i>Di Chen, Jia-mei Jin, Xin-jian Li (Nanjing University of Aeronautics and Astronautics)</i>	
T1A1-2 (11:10 - 11:25)	46
A Robotic Finger Driven by Patched Piezoelectric Actuators	
<i>Pengpeng Yu, Jiamei Jin, Zilong Ye (Nanjing University of Aeronautics and Astronautics)</i>	
T1A1-3 (11:25 - 11:40)	47
Fundamental design of a myoelectric prosthesis hand for children using pneumatic artificial muscles	
<i>Koyo Asano¹, Nobuo Takemoto², Shuichi Wakimoto¹, Hironari Taniguchi², Kosuke Morinaga³, Takefumi Kanda¹ (1Okayama University, 2Osaka Institute of Technology, 3Hiroshima International University)</i>	
T1A1-4 (11:40 - 11:55)	48
A Novel Three-Wheeled Mobile System Driven by a Three-dimensional Sandwich Piezoelectric Transducer	
<i>Liang Wang^{1,2}, Jens Twiefel², Jiamei Jin¹, Jörg Wallaschek² (1Nanjing University of Aeronautics and Astronautics, 2Leibniz University Hannover)</i>	
T1A1-5 (11:55 - 12:10)	49
Pancreatic beam expander with hollow ultrasonic motor	
<i>Zhangfan Xu, Song Pan, Lei Chen (Nanjing University of Aeronautics and Astronautics)</i>	
T1A1-6 (12:10 - 12:25)	50
Control Strategy of a Steerable Miniature Legged Robot based on Piezoelectric Actuators	
<i>Pancheng Zhu, Hanmin Peng, Chunsheng Zhao (Nanjing University of Aeronautics and Astronautics)</i>	

13 Sep. 2018 Thursday, 10:55 - 12:25

Chairperson: Joon-wan Kim (Tokyo Institute of Technology)

Room 2

T2A1 MEMS Sensors and Actuators 1

T2A1-1 (10:55 - 11:25)

[Cancelled] Mapping of acoustic radiation force and streaming patterns in SAW-driven acoustophoretic devices

Xiasheng Guo (Nanjing University)

T2A1-2 (11:25 - 11:40)

52

Acoustic Topographical Manipulations for Nanomotors

Xiaolong Lu¹, Wenjuan Liu², Kangdong Zhao¹ (1Nanjing Univeristy of Aeronautics and Astronautics, 2Nanjing Tecknological University)

T2A1-3 (11:40 - 11:55)

53

Fabrication of piezoelectric micromachined ultrasonic transducers for ultrasonic finger vein pattern recognition sensor

Hong Goo Yeo, Eunjung Shin, Hongsoo Choi (DGIST)

T2A1-4 (11:55 - 12:10)

54

Fast bonding technology by using partially-crosslinked SU-8 for MEMS-fabricated actuators and sensors

Zebing Mao, Kazuhiro Yoshida, Joon-wan Kim (Tokyo Institute of Technology)

13 Sep. 2018 Thursday, 10:55 - 12:25

Chairperson: Kenjiro Takemura (Keio University)

Room 3	T3A1 Ultrasonic Technologies 1
T3A1-1 (10:55 - 11:25)	55
Combined Ultrasonic-Magnetic Levitation for Linear Stages	
<i>Jens Twiefel, Viktor Hofmann, Igor Ille (Leibniz Universität Hannover)</i>	
T3A1-2 (11:25 - 11:55)	56
High-frequency Piezoelectric Transducers Technologies and Applications	
<i>Dawei Wu (Nanjing University of Aeronautics and Astronautics)</i>	
T3A1-3 (11:55 - 12:10)	57
Thick PZT epitaxial film and ScAlN film for ultrasonic transducer below 100 MHz	
<i>Yuka Mazda¹, Chiaki Masamune¹, Rei Karasawa¹, Takahiro Shimidzu¹, Takahiko Yanagitani^{1,2} (1Waseda Univ., 2JST PRESTO)</i>	
T3A1-4 (12:10 - 12:25)	58
Polarity inverted high efficiency ultrasonic transducer with (0001)ZnO/(000-1)ZnO/SiO ₂ glass buffer rod	
<i>Tsuyoshi Majima¹, Takahiro Shimidzu¹, Takahiko Yanagitani^{1,2} (1Waseda Univ., 2JST PRESTO)</i>	

14 Sep. 2018 Friday, 10:30 - 12:00

Chairperson: Mickael Lallart (INSA Lyon)

Room 1

F1A1 Sustainability Technology 2

F1A1-1 (10:30 - 11:00)

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LiNbO₃ thin films for high-temperature vibrational/thermal energy harvesters

Ausrine Bartasyte, Giacomo Clementi, Stefania Oliveri, Vincent Astié, Sabina Kuprenaite, Samuel Margueron, Bernard Dulmet (University of Bourgogne Franche-Comté)

F1A1-2 (11:00 - 11:15)

60

Mechanical Bending Strength and Electrical Properties on (Bi_{0.5}Na_{0.5})TiO₃-Based Lead-Free Piezoelectric Ceramics

Hajime Nagata, Tadashi Takenaka (Tokyo University of Science)

F1A1-3 (11:15 - 11:30)

61

Ternary Phase Diagram of (Bi_{1/2}Na_{1/2})TiO₃-SrTiO₃-BiFeO₃ Piezoelectric Ceramics

Jae-Shin Lee, Seong Hyun Kim, Chang-Heon Lee, Hyoung-Su Han (University of Ulsan)

F1A1-4 (11:30 - 11:45)

62

Temperature and frequency dependent phase transition of sol-gel synthesized (Bi_{0.5}Na_{0.5})TiO₃-SrTiO₃ thin films

Hyun-Young Lee, Jin Luo, Zhen Zhou, Wei Sun, Jing-Feng Li (Tsinghua University)

F1A1-5 (11:45 - 12:00)

63

Growth of orientation-controlled epitaxial (K, Na)NbO₃ films and their ferroelectric and piezoelectric properties

Yoshiharu Ito¹, Akinori Tateyama¹, Yoshiko Nakamura¹, Takao Shimizu¹, Minoru Kurosawa¹, Hiroshi Funakubo¹, Hiroshi Uchida², Takahisa Shiraishi³, Takanori Kiguchi³, Toyohiko J Konno³, Nobuhiro Kumada⁴, Mutsuo Ishikawa⁵ (1Tokyo Institute of Technology, 2Sop

14 Sep. 2018 Friday, 13:30 - 15:00

Chairperson: Tobias Hemsel (Paderborn University)

Room 1	F1P1 Ultrasonic Technologies 3
F1P1-1 (13:30 - 14:00)	64
The impact of RLC circuit on the shift of piezoelectric actuator resonant modes - a mathematic investigation <i>Tien-Fu Lu (University of Adelaide)</i>	
F1P1-2 (14:00 - 14:30)	65
Multidimensional Ultrasonic Bonding <i>Tobias Hemsell, Reinhard Schemmell, Collin Dymell, Matthias Hunstig2, Michael Brökelmann2, Walter Sextro1 (1Paderborn University, 2Hesse GmbH)</i>	
F1P1-3 (14:30 - 14:45)	66
Control of thixotropic gel using ultrasound <i>Kentaro Masuda, Daisuke Koyama, Mami Matsukawa (Doshisha University)</i>	
F1P1-4 (14:45 - 15:00)	67
Using Complex Multi-Dimensional and Multi-Frequency Vibration Trajectories in Ultrasonic Bonding <i>Reinhard Schemmell, Tobias Hemsell, Collin Dymell, Matthias Hunstig2, Michael Brökelmann2, Walter Sextro1 (1Paderborn University, 2Hesse GmbH)</i>	

14 Sep. 2018 Friday, 15:40 - 16:40

Chairperson: Daisuke Koyama (Doshisha University)

Room 1

F1P2 Smart Structures and Systems 3

F1P2-1 (15:40 - 15:55)

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Piezoelectric motor for micro air vehicle

Piotr Vasiljev^{1,2}, Dalius Mazeika^{1,3}, Sergejus Borodinas^{1,3}, Ying Yang¹, Regimantas Bareikis², Arunas Struckas² (1Nanjing University of Aeronautics and Astronautics, 2Lithuanian University of Educational Sciences, 3Vilnius Gediminas Technical University)

F1P2-2 (15:55 - 16:10)

69

A single-excited dual-rotor piezoelectric actuator for coaxial rotor MAV

Xinjian Li, Di Chen, Jiamei Jin (Nanjing University of Aeronautics and Astronautics)

F1P2-3 (16:10 - 16:25)

70

Design Flapping Wing Micro Air Vehicle Using an Ultrasonic Motor

Kenji Mihara, Tomoaki Mashimo (Toyohashi University of Technology)

F1P2-4 (16:25 - 16:40)

71

Non-axisymmetric Aspheric Ultraprecision Machining Using FPGA-based Piezoelectric FTS

Kuo-Ming Chang¹, Wen-Tien Cheng¹, Yung-Tien Liu¹, Wang-Long Li² (1National Kaohsiung University of Science and Technology, 2National Cheng Kung University)

14 Sep. 2018 Friday, 10:30 - 12:00

Chairperson: Zhao Gai (Nanjing University of Aeronautics and Astronautics)

Room 2

F2A1 Piezoelectric Actuator Applications

- F2A1-1 (10:30 - 10:45)** **73**
Design of piezoelectric positioning stages by means of the parasitic motion principle (PMP)
Hu Huang (Jilin University)
- F2A1-2 (10:45 - 11:00)** **72**
On the suppression of the backward motion of a piezo-driven precision positioning platform designed by the parasitic motion principle
Zhixin Yang, Xiaoqin Zhou, Hu Huang, Zunqiang Fan, Jingshi Dong, Hongwei Zhao (Jilin University)
- F2A1-3 (11:00 - 11:15)** **74**
Evaluation of an Ultrasonic Motor using Titanium for Sample Spinning in High Magnetic Field
Marie Obayashi¹, Takahiro Yano¹, Takefumi Kanda¹, Shuichi Wakimoto¹, Kiyonori Takegoshi², Tatsuya Matsunaga² (1Okayama University, 2Kyoto University)
- F2A1-4 (11:15 - 11:30)** **75**
Research on Optimization of Control Moment Gyroscope Driven by Hollow Ultrasonic Motor
Song Pan, Zhangfan Xu (Nanjing University of Aeronautics and Astronautics)
- F2A1-5 (11:30 - 11:45)** **76**
A Valveless Piezoelectric Pump with Dual Vibrators Based on Standing Waves
Fangyi Wang, Jiamei Jin (Nanjing University of Aeronautics and Astronautics)
- F2A1-6 (11:45 - 12:00)** **77**
Development of a Small Three-way Valve using Particle Excitation by a Piezoelectric Vibrator for the Driving of Fluidic Actuator
Kou Hashimoto¹, Hayato Osaki¹, Takehumi Kanda¹, Shuichi Wakimoto¹, Hikaru Yamamoto¹, Koichi Suzumori², Takahiro Ukida², Hiroyuki Nabae² (1Okayama university, 2Tokyo Institute of Technology)

14 Sep. 2018 Friday, 13:30 - 14:45

Chairperson: Takashi Iijima (AIST)

Room 2

F2P1 MEMS Sensors and Actuators 2

- F2P1-1 (13:30 - 13:45)** **78**
MEMS Tactile Device by Using Multilayered Piezoelectric Thin Film
So Toyama, Kensuke Kanda, Kosuke Takahara, Takayuki Fujita, Kazusuke Maenaka (University of Hyogo)
- F2P1-2 (13:45 - 14:00)** **79**
High-Efficient Piezoelectric MEMS Vibration Energy Harvester using Sputtered BiFeO₃ films
Masaaki Aramaki¹, Takeshi Yoshimura¹, Shuichi Murakami², Kazuo Satoh², Norifumi Fujimura¹ (1Osaka Prefecture University, 2Osaka Research Institute of Industrial Science and Technology)
- F2P1-3 (14:00 - 14:15)** **80**
PiezoMEMS Capacitor Degradation over Time/Temperature
Joe Evans, Naomi Smith, Gerald Salazar, Bob Howard, Spencer Smith, Scott Chapman (Radiant Technologies, Inc.)
- F2P1-4 (14:15 - 14:30)** **81**
Development of MEMS-fabricated Bidirectional ECF micropump
Tatsuya Matsubara, Kazuhiro Yoshida, Joon-wan Kim (Tokyo Institute of Technology)
- F2P1-5 (14:30 - 14:45)** **82**
Modeling Electro-conjugate Fluid (ECF) Jet by Using Onsager Effect
Joon-wan Kim, Yusuke Tanabe, Shinichi Yokota (Tokyo Institute of Technology)

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SONOMECHATRONICS - a key technology for life sciences -	
<i>Jörg Wallaschek, Hendrik Ohrdes, Jens Twiefel (Leibniz Universität Hannover)</i>	
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A novel monopolar/ultrasonic hybrid energy device with a stabilized probe vibration speed	
<i>Tatsuya Suzuki, Yukihiro Sawada, Yuji Kishimoto, Yusuke Otsuka, Hideo Sanai, Norihiro Yamada, Kenichi Kimura (Olympus Corporation)</i>	
F3A1-3 (11:15 - 11:30)	85
Observation of Ultrasound Wave from Exterior of a Metal Pipe for Flowing Gas Measurement	
<i>Mahjabin Taskin, Ginshiro Utsumi, Yoshimine Kato (Kyushu University)</i>	
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Optimization of Ultrasonic Acoustic Standing Wave Systems	
<i>Paul Dunst¹, Tobias Hemsell, Peter Bornmann², Walter Littmann², Walter Sextro¹ (1Paderborn University, 2ATHENA Technologie Beratung GmbH)</i>	

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Room 3 F3P1 Piezoelectric Materials and Manufacturing Processes

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Measurement of Polarization-Inverted Structure in Layered Piezoelectric Material Using Scanning Nonlinear Dielectric Microscopy

Hiroyuki Odagawa¹, Yasuo Cho² (1National Institute of Technology, Kumamoto College, 2Tohoku University)

F3P1-2 (14:00 - 14:15)

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Comparison of kt^2 extraction method from film/substrate structure by using the ratio of resonant frequencies with conventional methods

Makoto Totsuka¹, Takahiko Yanagitani^{1,2} (1Waseda University, 2JST PRESTO)

F3P1-3 (14:15 - 14:30)

89

Influence of negative ions generation on the quality of ScAlN films grown by sputtering targets with different concentration of oxygen and carbon

Yuka Endo¹, Rei Karasawa¹, Shinji Takayanagi², Makoto Imakawa³, Keisuke Morisaka³, Yu Suzuki³, Takahiko Yanagitani^{1,4} (1Waseda University, 2Nagoya Institute of Technology, 3FURUYA METAL Co., Ltd., 4JST PRESTO)

F3P1-4 (14:30 - 14:45)

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Electrical Characteristics and Structural Analysis of PZT Films Fabricated by Aerosol-Deposition Method.

Chun-Kil Park¹, Jong-Jin Choi², Byung-Dong Hahn², Dae-Yong Jeong¹ (1Inha University, 2Korea Institute of Materials Science)

F3P1-5 (14:45 - 15:00)

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Low-temperature crystallization of $(\text{Na}_{1-x}\text{K}_x)\text{NbO}_3$ thin film assisted by two-dimensional $\text{Ca}_2\text{Nb}_3\text{O}_{10}$ nanosheet seed layer

Sang Hyo Kweon, Jong Hyun Kim, Mir Im, Woong Hee Lee, Sahn Nahm (Korea University)

14 Sep. 2018 Friday, 15:40 - 16:40

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Room 3

F3P2 Materials characterization methods

F3P2-1 (15:40 - 15:55)

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Measurement of particle size under sequential impacts using a combination of resonance flexural vibration modes

Takuya Kikkawa, Daisuke Koyama, Mami Matsukawa (Doshisha University)

F3P2-2 (15:55 - 16:10)

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Nonlinear elastic coefficients of piezoelectric material in Langevin transducer analyzed with transfer matrix

Naruhiro Iwama, Susumu Miyake, Takeshi Morita (The University of Tokyo)

F3P2-3 (16:10 - 16:25)

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Saw-tooth type piezoelectric multimodal energy harvester

Dalius Mazeika^{1,2}, Andrius Ceponis¹, Piotr Vasiljev^{1,3}, Sergejus Borodinas^{1,2} (1Nanjing University of Aeronautics and Astronautics, 2Vilnius Gediminas Technical University, 3Lithuanian University of Educational Sciences)

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Multiferroic Magnetolectric Coupling Effect with Optimized Adhesion Layer

Geon Tae Hwang¹, Haribabu Palneedi¹, Mahesh Peddigari¹, Byung-Dong Hahn¹, Jong-Jin Choi¹, Cheol-Woo Ahn¹, Jong-Woo Kim¹, Yuho Min¹, Woon-Ha Yoon¹, Dong Soo Park¹, Joon-Hwan Choi¹, Youngson Choe², Kwang Ho Kim², Jungho Ryu³ (1Korea Institute of Materials S

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- P1-01 (10:00 - 10:30 / 15:00 - 15:40) 96**
Energy Storage Properties of Nano-crystalline Bi_{1.5}ZnNb_{1.5}O₇ Thick Films Fabricated on Flexible Metal Foil
Jin-Woo Kim¹, Ji-Ho Lim¹, Seung-Hyun Kim², Chang Young Koo³, Jungho Ryu⁴, Dae-Yong Jeong¹ (1Inha University, 2Brown University, 3Quintess Co., Ltd., 4Yeungnam University)
- P1-02 (10:00 - 10:30 / 15:00 - 15:40) 97**
BLE module operation by piezoelectric thin-film energy harvesters
Takashi Ito, Toshihito Umegaki, Isaku Kanno (Kobe University)
- P1-03 (10:00 - 10:30 / 15:00 - 15:40) 98**
Kinetic Energy Harvesting from Human Walking using Piezoelectric-Electromagnetic Hybrid System
Won Seop Hwang, Se Yeong Jeong, Jung Hwan Ahn, Jae Yong Cho, Yewon Song, Seong Do Hong, Tae Hyun Sung (Hanyang University)
- P1-04 (10:00 - 10:30 / 15:00 - 15:40) 99**
Uniform Stress Distribution Structure Piezoelectric Energy Harvester with Input Displacement Amplifying Mechanism
Jung Hwan Ahn, Won Seop Hwang, Sang Bum Woo, Jae Yong Cho, Seong Do Hong, Yewon Song, Tae Hyun Sung (Hanyang University)
- P1-05 (10:00 - 10:30 / 15:00 - 15:40) 100**
Design Optimization of Electromagnetic-based Contactless Piezoelectric Energy Harvester for Wireless Sensor System
Jihoon Kim, Taekyun Kim, Tae Hee Lee, Yewon Song, Tae Hyun Sung (Hanyang University)
- P1-06 (10:00 - 10:30 / 15:00 - 15:40) 101**
Ferroelectric Properties of PZT based Composite Film Fabricated by Aerosol Deposition Method
Dong-Kyun Kang¹, Ji-Ho Lim¹, Chun-Kil Park¹, Mahesh Peddigari², Jung-ho Ryu³, Dae-Yong Jeong¹ (1Inha University, 2Korea Institute of Materials Science (KIMS), 3Yeungnam University)
- P1-07 (10:00 - 10:30 / 15:00 - 15:40) 102**
A Piezoelectric Ceramic Sensor for Measuring Mechanomyogram during Exercise
Naoto Hayakawa, Takefumi Kanda, Shuichi Wakimoto, Hisao Oka (Okayama University)

- P1-08 (10:00 - 10:30 / 15:00 - 15:40)** **103**
Durability Design of a Piezoelectric Energy Harvester under Large Deformation
Yewon Song, Sang Bum Woo, Jeong Pil Jhun, Jihoon Kim, Tae Hee Lee, Tae Hyun Sung (Hanyang University)
- P1-09 (10:00 - 10:30 / 15:00 - 15:40)** **104**
On-site resonance frequency adjustment of magnetostrictive vibrational power generator under real vibration using magnetic force
Fumiya Makino, Toshiyuki Ueno (Kanazawa University)
- P1-10 (10:00 - 10:30 / 15:00 - 15:40)** **105**
An evaluation method of direct piezoelectric coefficients of thin films using both-ends-fixed unimorph beams
Toshihito Umegaki¹, Kohei Issiki², Isaku Kanno¹ (1Kobe University, 2Kyoto University)
- P1-11 (10:00 - 10:30 / 15:00 - 15:40)** **106**
[Cancelled] Depth-dependent Structural Characterization of RF Sputtered PMN-PT Thin Films by Glancing Incidence X-ray Diffraction
Namkyoung Choi^{1,2}, Ki-Bok Kim^{1,2}, Yong-Il Kim^{1,2} (1Korea Research Institute of Standards and Science, 2University of Science and Technology)
- P1-12 (10:00 - 10:30 / 15:00 - 15:40)** **107**
FEM Analyses of Acoustic Streaming Field in the Ultrasonic Needle-Liquid-Substrate System for Micro/Nano Concentration
Qingyang Liu, Qiang Tang, Junhui Hu (Nanjing University of Aeronautics and Astronautics)
- P1-13 (10:00 - 10:30 / 15:00 - 15:40)** **108**
Pulse-Echo Detection of Lamé Mode Lamb Wave for Non-Destructive Testing Using Nonlinear Ultrasonic Wave Method
Makoto Fukuda, Kazuhiko Imano (Akita University)
- P1-14 (10:00 - 10:30 / 15:00 - 15:40)** **109**
Ultrasonic plate transducer for tactile display using multiple vibration modes
Hiroshi Kimura, Masaya Takasaki, Daisuke Yamaguchi, Masayuki Hara, Yuji Ishino, Takeshi Mizuno (Saitama University)

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Growth of Single Crystal Using Aerosol Deposition Process with Single Crystal Seed Grown by Abnormal Grain Growth in KNN Based Ceramics
Ju-Seung Lee¹, Ji-Ho Lim¹, Seung-Hee Lee¹, Cheol-Woo Ahn², Dae-Yong Jeong¹ (1Inha University, 2Korea Institute of Materials Science (KIMS))
- P2-02 (9:45 - 10:15 / 10:15 - 10:55) 111**
Growth Process of BT and BNT Films on Various Substrates Deposited by Aerosol Deposition
seunghee Lee, Ji-Ho Lim, Chun-Kil Park, Dae-Yong Jeong (Inha university)
- P2-03 (9:45 - 10:15 / 10:15 - 10:55) 112**
Al concentration dependence on crystal structure of Ca₃B(Ga,Al)₃Si₂O₁₄ (B = Nb and Ta) piezoelectric single crystals
Yuui Yokota¹, Tetsuo Kudo², Yuji Ohashi¹, Kenji Inoue², Masao Yoshino¹, Akihiro Yamaji¹, Shunsuke Kurosawa³, Kei Kamada¹, Akira Yoshikawa^{1,4} (1Tohoku University, 2Piezo Studio Inc., 3Yamagata University, 4C&A Corporation)
- P2-04 (9:45 - 10:15 / 10:15 - 10:55) 113**
Deposition of piezoelectric KNbO₃/PbTiO₃ films for ultra high frequency and high intensity ultrasonic transducers
Mutsuo Ishikawa¹, Youske Uchida¹, Takahisa Shiraishi², Marie Tabaru³, Hiroshi Funakubo³ and Minoru Kurosawa³ (1Toin University of Yokohama, 2Tohoku University, 3Tokyo Institute of Technology)
- P2-05 (9:45 - 10:15 / 10:15 - 10:55) 114**
Evaluation of piezoelectric properties of rare earth fluorides
Kei Kamada^{1,2}, Tetsuo Kudo³, Kenji Inoue³, Kyoung Jin Kim¹, Yasuhiro Shoji^{1,2}, Vladimir V. Kochurikhin¹, Akihiro Yamaji², Shunsuke Kurosawa², Yuji Ohashi², Yuui Yokota², and Akira Yoshikawa^{1,2} (1C&A corporation, 2Tohoku University, 3Piezo Studio Inc.)
- P2-06 (9:45 - 10:15 / 10:15 - 10:55) 115**
IDT Reflector Improvement to Investigate Wave Leakage for a Surface Acoustic Wave Motor
Deqing Kong, Minoru Kuribayashi Kurosawa (Tokyo Institute of Technology)
- P2-07 (9:45 - 10:15 / 10:15 - 10:55) 116**
The Method of Improving Flow Characteristics for Air Flow Control Valve Using Particle Excitation by PZT transducer
Yuya Miyake, Tomomi Yamaguchi, Naomichi Furushiro, Daisuke Hirooka (Kansai University)

- P2-08 (9:45 - 10:15 / 10:15 - 10:55)** **117**
A Novel piezoelectric inertial rotary motor for micro underwater vehicles
Le Wang, Xiaolong Lu, Chunsheng Zhao (Nanjing University of Aeronautics and Astronautics)
- P2-09 (9:45 - 10:15 / 10:15 - 10:55)** **118**
Evaluation of the effectiveness of flow control valve utilizing torsional vibration by PZT transducer
Ryosuke Takasaki¹, Daisuke Hirooka², Naomichi Furushiro², Tomomi Yamaguchi² (1Graduate School of Kansai University, 2Kansai University)
- P2-10 (9:45 - 10:15 / 10:15 - 10:55)** **119**
Research for ultrasonic motor matching method and driving circuit simulation technology based on Saber
Juping Gu, Laiwu Luo, Pengyang Wang, Hui Yang, Liang Hua (Nantong University)
- P2-11 (9:45 - 10:15 / 10:15 - 10:55)** **120**
A non-metal traveling-wave ultrasonic motor with alumina/PZT vibrator for acid/alkaline applications
Jiang Wu, Yosuke Mizuno, Kentaro Nakamura (Tokyo Institute of Technology)
- P2-12 (9:45 - 10:15 / 10:15 - 10:55)** **121**
Modeling and dynamics analysis on pseudo-rigid-body for the swing vibrator of the caudal-fin-like Valve-less Piezoelectric Pump
Xiaoqi Hu¹, Ruihua Zhang¹, Zhangping You¹, Jianhui Zhang² (1Lishui University, 2Guangzhou University)
- P2-13 (9:45 - 10:15 / 10:15 - 10:55)** **122**
Experimental Study on Flow Characteristics of Valve-less Piezoelectric Pump with Triangular Prism Bluff Bodies
Ruihua Zhang¹, Xiaoqi Hu¹, Jianhui Zhang² (1Lishui University, 2Guangzhou University)
- P2-14 (9:45 - 10:15 / 10:15 - 10:55)** **123**
Study on Photocatalytic Properties of TiO₂-SiO₂ Thin Film fabricated by Laser Irradiation
Chaewon Bak^{1,2}, Daeyong Jeong¹, Hyeonjin Eom² (1Inha University, 2Korea Institute of Industrial Technology (KITECH))

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Studies on Amino Acid Fermentation Process using Slaughtered Pig Blood <i>Sun Kon Lee¹, Yong Rae Kim¹, Tae Jung Yoo¹, Sun Ho Kang¹, H. G Park¹, Haesung Park², Kiwoo Kim², Deokgyu Park², Taeheon Han² (1University of Inha, 2NANUM Co.,Ltd.)</i>	
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Doping effect of lead-free K _{0.5} Na _{0.5} NbO ₃ thin films by multi-target RF-magnetron sputtering <i>Shintaro Nishioka, Goon Tan, Toshihito Umegaki, Isaku Kanno (Kobe University)</i>	
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A study on Flow characteristics of Automotive Variable Displacement Swash plate type Compressor Electromagnetic Control Valve to amount of Valve Activation <i>Geon-Woong Baek¹, Ji-Ho Lim², Haeng-muk Cho¹ (1Kongju National University, 2Inha University)</i>	

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Design of ER Braking Device for Micro-Mobile Robot <i>Takanori TOGAWA, Takuma TACHIBANA, Yutaka TANAKA (Hosei University)</i>	
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The soft and sensitive door-pinching sensor utilizing acoustic characteristics of an elastic tube <i>Soshi Shimomura, Kento Fujii, Marie Tabaru (Tokyo Institute of Technology)</i>	
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Dielectric properties of lead-free Bi _{1/2} Na _{1/2} TiO ₃ -SrTiO ₃ thick films fabricated by aerosol deposition <i>Han-Bo Jung, Seung-Hee Lee, Ji-Ho Lim, Dae-yong Jeong (Inha University)</i>	
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Poster Session 1

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Energy Storage Properties of Nano-crystalline Bi_{1.5}ZnNb_{1.5}O₇ Thick Films Fabricated on Flexible Metal Foil
Jin-Woo Kim¹, Ji-Ho Lim¹, Seung-Hyun Kim², Chang Young Koo³, Jungho Ryu⁴, Dae-Yong Jeong¹ (1Inha University, 2Brown University, 3Quintess Co., Ltd., 4Yeungnam University)
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Kinetic Energy Harvesting from Human Walking using Piezoelectric-Electromagnetic Hybrid System
Won Seop Hwang, Se Yeong Jeong, Jung Hwan Ahn, Jae Yong Cho, Yewon Song, Seong Do Hong, Tae Hyun Sung (Hanyang University)
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Uniform Stress Distribution Structure Piezoelectric Energy Harvester with Input Displacement Amplifying Mechanism
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Ferroelectric Properties of PZT based Composite Film Fabricated by Aerosol Deposition Method
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A Piezoelectric Ceramic Sensor for Measuring Mechanomyogram during Exercise
Naoto Hayakawa, Takefumi Kanda, Shuichi Wakimoto, Hisao Oka (Okayama University)

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On-site resonance frequency adjustment of magnetostrictive vibrational power generator under real vibration using magnetic force
Fumiya Makino, Toshiyuki Ueno (Kanazawa University)
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Makoto Fukuda, Kazuhiko Imano (Akita University)
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Growth of Single Crystal Using Aerosol Deposition Process with Single Crystal Seed Grown by Abnormal Grain Growth in KNN Based Ceramics
Ju-Seung Lee¹, Ji-Ho Lim¹, Seung-Hee Lee¹, Cheol-Woo Ahn², Dae-Yong Jeong¹ (1Inha University, 2Korea Institute of Materials Science (KIMS))
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Evaluation of piezoelectric properties of rare earth fluorides
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- P2-06 (9:45 - 10:15 / 10:15 - 10:55) 115**
IDT Reflector Improvement to Investigate Wave Leakage for a Surface Acoustic Wave Motor
Deqing Kong, Minoru Kuribayashi Kurosawa (Tokyo Institute of Technology)
- P2-07 (9:45 - 10:15 / 10:15 - 10:55) 116**
The Method of Improving Flow Characteristics for Air Flow Control Valve Using Particle Excitation by PZT transducer
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Xiaoqi Hu¹, Ruihua Zhang¹, Zhangping You¹, Jianhui Zhang² (1Lishui University, 2Guangzhou University)
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Ruihua Zhang¹, Xiaoqi Hu¹, Jianhui Zhang² (1Lishui University, 2Guangzhou University)
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Chaewon Bak^{1,2}, Daeyong Jeong¹, Hyeonjin Eom² (1Inha University, 2Korea Institute of Industrial Technology (KITECH))

14 Sep. 2018 Friday, 15:00 - 15:40

Chairperson: Daisuke Yamaguchi (Saitama University)

Exhibition Hall

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