

SCIENTIFIC PROGRAMME

9th FORUM ON NEW MATERIALS

OPENING SESSION

WELCOME ADDRESSES

Plenary Lectures

F:PL1 Organic Actuators for Living Cell Opto Stimulation

G. LANZANI, Center for Nano Science and Technology@PoliMi, Istituto Italiano di Tecnologia, and Department of Physics, Politecnico di Milano, Milano, Italy

F:PL2 New Materials and Approaches

R.S. RUOFF, Ulsan National Institute of Science & Technology (UNIST), Ulsan, South Korea

F:PL3 Brain-inspired Materials, Devices, and Circuits for Intelligent Systems

YONG CHEN, University of California, Los Angeles, CA, USA

SYMPOSIUM FA

3D PRINTING AND BEYOND: STATE-OF-THE-ART AND NEW PARADIGMS FOR ADDITIVE MANUFACTURING TECHNOLOGIES

Session FA-1

Additive manufacturing of ceramics and composites

FA-1:IL01 Multimaterial 3D Printing of Functional Ceramics for Energy Applications

M. TORRELL¹, **A. PESCE¹**, **M. NUÑEZ¹**, **A. HORNÉS¹**, **A. MORATA¹**, **A. TARANCÓN^{1,2}**, ¹Catalonia Institute for Energy Research, Sant Adrià de Besòs, Barcelona, Spain; ²ICREA, Barcelona, Spain

FA-1:IL02 Quality Aspects with Regard to 3D Printing of Ceramics

R. RAETHER, J. VOGT, Fraunhofer Zentrum für Hochtemperatur-Leichtbau HTL, Bayreuth, Germany

FA-1:IL03 Ultraviolet Laser Lithography of Ceramic Components as Direct Additive Manufacturing

SOSHU KIRIHARA, Osaka University, Ibaraki City, Osaka, Japan

FA-1:IL04 New Approaches for Powder Bed Fusion of Ceramics

F. VERGA, T. GRAULE, M. SCHMID, K. WEGENER, Inspire AG, St. Gallen, Switzerland

FA-1:IL05 Additive Manufacturing (AM) of Ceramics Using XJET Technology

A. BENICHO, XJET Ltd., Rehovot, Israel

FA-1:IL06 Stereolithography of Ceramic Components using Binary Materials

HUI-SUK YUN, Korea Institute of Materials Science, Gyeongnam, South Korea

FA-1:IL07 Fabrication of Ceramic and Metal Components using Direct Writing Technique in Solution

HIROYA ABE, Osaka University, Ibaraki, Osaka, Japan

FA-1:IL08 From Lab to Mass Production Ceramic Additive Manufacturing: Will Be

C. CHAPUT, 3dceram, Limoges, France

FA-1:IL09 Clinical Significance of 3D Printing in Bone Disorder

S. BOSE, School of Mechanical and Materials Engineering, Department of Chemistry, Elson Floyd College of Medicine, Washington State University, Pullman, WA, USA

FA-1:IL10 Additive Manufacturing of Implantable Biomaterials: Processing Challenges, Biocompatibility Assessment and Clinical Translation

B. BASU, Materials Research Centre & Center for BioSystems Science and Engineering, Indian Institute of Science, Bangalore, India

FA-1:IL11 Synthesis and Additive Manufacturing of Polycarbosilane Systems

K. MARTIN^{1,2}, **L.A. BALDWIN¹**, **T.PATEL^{1,3}**, **L.M. RUESCHHOFF¹**, **C. WYCKOFF^{1,4}**, **J.J. BOWEN^{1,2}**, **M. CINIBULK¹**, **M.B. DICKERSON¹**, ¹Materials and Manufacturing Directorate, Air Force Research Laboratory, Wright-Patterson AFB, OH, USA; ²UES Inc., Dayton, OH, USA; ³NRC Research Associateship Programs, Washington DC, USA; ⁴Wright State University, Fairborn, OH, USA

FA-1:IL12 Extending the Limits of Additive Manufacturing: Emerging Techniques to Process Metal-matrix Composites with Customized Properties

A. SOLA, **A. TRINCHI**, Commonwealth Scientific and Industrial Research Organisation (CSIRO) Australia, Manufacturing Business Unit, Metal Industries Program, Clayton, Australia

FA-1:IL13 Patient Specific Stainless Steel 316 - Tricalcium Phosphate Biocomposite Cellular Structures for Tissue Applications Via Binder Jet Additive Manufacturing

K. AGARWAL, **J. RUPRECHT**, Department of Automotive and Manufacturing Engineering Technology, Mankato, Minnesota, USA; **M. BENTLEY**, **B. HAUS**, **E. ZUIKER**, **M. HASAN**, Department of Biological Sciences, Minnesota State University, Mankato, Minnesota, USA

Session FA-2

Additive manufacturing of polymeric, metallic and multi-material structures

FA-2:L01 Topological Optimization Design for Microstructure Configuration of Lattice Material Support Structures for Additive Manufacturing

JIawei CAO, Innovation & Research Institute of Hiwing Technology Academy, Beijing, China

FA-2:L02 3D Printing of Multifunctional Composites Using Frontal Polymerization

P.H. GEUBELLE, **JIA EN AW**, **XIANG ZHANG**, **N.R. SOTTOS**, **J.S. MOORE**, Beckman Institute of Advanced Science and Technology University of Illinois at Urbana-Champaign, Urbana, IL, USA

FA-2:L03 Inconel-steel Multilayers by Liquid Dispersed Metal Powder Bed Fusion: Microstructure, Residual Stress and Property Gradients

S.C. BODNER, **J. ZALESK**, **J. TODT**, **J.F. KECKES**, **V. MAIER-KIENER**, **J. KECKES**, Montanuniversität Leoben and Austrian Academy of Sciences, Leoben, Austria; **B. SARTORY**, Materials Center Leoben, Leoben, Austria; **N. SCHELL**, Helmholtz Zentrum Geesthacht, Geesthacht, Germany; **L.T.G. VAN DE VORST**, The Netherlands Organisation for Applied Scientific Research, Eindhoven, The Netherlands; **J.W. HOOIJMANS**, **J.J. SAURWALT**, Admatec Europe BV, Moergestel, The Netherlands

FA-2:L04 Theoretical and Experimental Study of the Processes of Selective Laser Melting and Electron Beam Melting

M.G. KRINITCYN, **R.O. CHEREPANOV**, Tomsk Polytechnic University, Tomsk, Russia

FA-2:L05 A Research on Shrink Lines Observed in Selective Laser Melting of Nickel-based Superalloy

G. DURSUN, **B. PEHLIVANOĞULLARI**, **C. SEN**, **E. BEDİR**, **A. ORHANGUL**, TEI, Eskisehir, Turkey

FA-2:IL06 Residual Stresses in Additively Manufactured Aluminum Alloys and 316L Steel

M.-A. NIELSEN, E. MAADWAD, D. LOTT, P. STARON, Institute of Material Research, Helmholtz-Zentrum Geesthacht, Germany; S. BODNER, J. KECKES, Erich Schmid Institute, Montanuniversität Leoben, Austria; G. RESCH, Resch GmbH, Glojach, Austria

FA-2:IL07 Additive Manufacturing of Multi-material Structures

A. BANDYOPADHYAY, School of Mechanical and Materials Engineering, Washington State University, Pullman, WA, USA

FA-2:IL08 Residual Stress and Microstructure Gradients in Additively-manufactured Metallic Components Characterized by High-energy Synchrotron X-ray Diffraction

J. KECKES, S.C. BODNER, J. TODT, Montanuniversität Leoben and Austrian Academy of Sciences, Leoben, Austria; N. SCHELL, Helmholtz Zentrum Geesthacht, Geesthacht, Germany

FA-2:IL09 Mechanical Behavior of Sheet-based Scaffolds Produced via L-PBF for Orthopedic Applications

C. KELLY, K. GALL, Duke University, Durham, NC, USA

FA-2:IL10 Understanding the Powder as Key for Laser Sintering with Polymers

M. SCHMID, Inspire AG, Innovation Center for Additive Manufacturing Switzerland (icams), St. Gallen, Switzerland

FA-2:IL11 The Role of Rheology in Laser Sintering of Polymer Particles

P. ANDERSON, Polymer Technology Group, Eindhoven University of Technology, Eindhoven, Noord-Brabant, The Netherlands

FA-2:IL12 Two-color Irradiation for Volumetric Photopolymerization Confinement

T.F. SCOTT^{1,2}, H.L. VAN DER LAAN³, MARK A. BURNS^{4,5}, ¹Department of Chemical Engineering, Monash University, Clayton, VIC, Australia; ²Department of Materials Science and Engineering, Monash University, Clayton, VIC, Australia; ³Macromolecular Science and Engineering Program, University of Michigan, Ann Arbor, MI, USA; ⁴Department of Chemical Engineering, University of Michigan, Ann Arbor, MI, USA; ⁵Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI, USA

FA-2:IL13 High-strength and Programmable Meta-crystals

MINH-SON PHAM, Imperial College London, London, UK

FA-2:IL14 Aerosol and Paste Based Additive Manufacturing

F. BRUECKNER^{1,2}, L. STEPIEN¹, M. GREIFZU^{1,3}, E. SACHSE^{1,3}, T. ULRICH^{1,3}, E. LOPEZ¹, C. LEYENS^{1,3}, ¹Fraunhofer Institute for Material and Beam Technology, Dresden, Germany; ²Luleå University of Technology, Luleå, Sweden; ³Technische Universität Dresden, Dresden, Germany

Session FA-3

Applications of 3D Printing technologies

FA-3:IL01 3D Printing of Functional Architectures built from Two-Dimensional Materials

S. BARG, University of Manchester, Manchester, UK

FA-3:IL02 Microstructure Control of Metals via Additive Manufacturing Processes

M. SEITA, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

Focused Session FA-4 / FP-8

Progress in 3D Bioprinting of Soft Tissues and Organs

(Focused Joint Session with Conference FP)

FA-4/FP-8:IL01 Two Photon Polymerization for Biofabrication

R. NARAYAN, North Carolina State University, Raleigh, NC, USA

FA-4/FP-8:IL02 Engineering Surface Properties of 3D Printed Scaffolds to Steer and Control Cell Activity in Tissue Regeneration

L. MORONI, Maastricht University, MERLN Institute for Technology-Inspired Regenerative Medicine, Complex Tissue Regeneration Department, Maastricht, The Netherlands

FA-4/FP-8:IL03 Strategies for Bioprinting of Volumetric Tissue Constructs

M. GELINSKY, Centre for Translational Bone, Joint and Soft Tissue Research, TU Dresden, Dresden, Germany

FA-4/FP-8:IL04 Biomimetic Natural Polymer-based Bioinks for Microtissue Modelling

P. GENTILE, A. SCALZONE, R. DA CONCEICAO RIBEIRO, A.M. FERREIRA, K. DALGARNO, School of Engineering, Newcastle University, Claremont Road, Newcastle Upon Tyne, UK

FA-4/FP-8:IL05 Engineering the Cellular Niche Via CAD/CAM Laser Processing

J. SAKSENA¹, S.C. SKLARE¹, B.T. VINSON¹, Y. HUANG², **D.B. CHRISSEY**¹, ¹Tulane University, New Orleans, LA, USA; ²University of Florida, Gainesville, FL, USA

FA-4/FP-8:IL06 Multimaterial and Multiscale Biofabrication Approach

C. DE MARIA, Research Center E. Piaggio and Dept. of Information Engineering at University of Pisa, Pisa, Italy

FA-4/FP-8:IL07 Engineering Skeletal Muscle Tissue with Innovative Biofabrication Approaches

M. COSTANTINI, Institute of Physical Chemistry - PAN, Warsaw, Poland; C. GARGIOLI, Università degli studi di Roma - Tor Vergata, Rome, Italy

FA-4/FP-8:IL08 Putting 3D Bioprinting to the Use of Tissue Model Fabrication

Y. SHRIKE ZHANG, Department of Medicine, Harvard Medical School, Cambridge, MA, USA

FA-4/FP-8:IL09 3D Bioprinted Tissue Substitutes: Recent Advances and Prospects in Healthcare

M. DOMINGOS, Department of Mechanical, Aerospace and Civil Engineering, School of Engineering, Faculty of Science and Engineering, The University of Manchester, Manchester, UK

FA-4/FP-8:IL10 Scaffold-free Bio-3D Printing for Solid organ fabrication

KOICHI NAKAYAMA, Department of Regenerative Medicine and Biomedical Engineering, Faculty of Medicine, Saga University, Saga, Japan

SYMPOSIUM FB

MATERIALS ISSUES IN FLEXIBLE AND STRETCHABLE ELECTRONICS FOR DEVICE RELIABILITY AND PERFORMANCE

Session FB-1

Materials and fabrication processes

FB-1:IL01 Development of High Performance Semiconductor Inks

for Printed Flexible Field-effect Transistors and Integrated Circuits
YONG-YOUNG NOH, Department of Chemical Engineering, Pohang University of Science and Technology (POSTECH), Pohang, South Korea

FB-1:IL02 Roll-to-Roll Printed Flexible Optoelectronics

JUNLIANG YANG, Institute of Super-microstructure and Ultrafast Process in Advanced Materials, School of Physics and Electronics, Central South University, Changsha, Hunan, China

FB-1:IL03 Printed and Flexible Electronics and Photonics with Graphene and 2D Materials for Sensing, Wearable Electronics and Bioelectronics

F. TORRISI, Imperial College London, London, UK

FB-1:IL04 New Inks for 2D, 3D and 4D Electronics

S. MAGDASSI, Institute of Chemistry, The Hebrew University of Jerusalem, Jerusalem, Israel

FB-1:IL05 Flexible and Stretchable Organic Electronics

QIBING PEI, University of California at Los Angeles, Los Angeles, CA, USA

FB-1:IL06 Solution Processing of Organic-Inorganic Hybrid Semiconductor for Flexible Large Area Electronics

MYUNG-GIL KIM, School of Advanced Materials Science & Engineering, Sungkyunkwan University, Suwon, South Korea

FB-1:IL07 Programmable Gold Nanowire Tattoo for Multimodal Wearable Sensors

WENLONG CHENG, Department of Chemical Engineering, Monash University, Clayton, Victoria, Australia and Ambassador Technology Fellow, Melbourne Centre for Nanofabrication, Clayton, Victoria, Australia

FB-1:L08 Charge Carrier Mobility vs. Birefringence: Highly Oriented Liquid Crystal Organic Semiconductors

M.J. HAN¹, D. WEI², Y.H. KIM³, H. AHN⁴, T.J. SHIN⁵, N.A. CLARK⁶, D.M. WALBA², **DONG KI YOON**^{1,7}, ¹Graduate School of Nanoscience and Technology, KAIST, Daejeon, South Korea; ²Dept. of Chemistry and Biochemistry, Soft Materials Research Center, University of Colorado, Boulder, CO, USA; ³Advanced Functional Materials Research Group, KRIST, Daejeon, South Korea; ⁴Pohang Accelerator Laboratory, POSTECH, Pohang, South Korea; ⁵UNIST Central Research Facilities & School of Natural Science, UNIST, Ulsan, South Korea; ⁶Dept. of Physics and Soft Materials Research Center, University of Colorado, Boulder, CO, USA; ⁷Dept. of Chemistry and KINC, KAIST, Daejeon, South Korea

FB-1:L09 Graphene-modified E-textiles: An Industry Relevant Approach of Doping and Visualizing Fully Textile P-N Junction Diodes

M. ASADI MIANKAFSHE^{1,2}, T. BASHIR^{1,3}, N.-K. PERSSON^{1,2}, ¹The Swedish School of Textiles, Polymeric E-textiles, University of Borås, Borås, Sweden; ²Smart Textiles, University of Borås, Borås, Sweden; ³Swedish Centre for Resource Recovery, University of Borås, Borås, Sweden

Session FB-2

Device physics and design

FB-2:L01 Soft Electronic and Robotic Systems from Resilient yet Biocompatible and Degradable Materials

M. KALTENBRUNNER, Department of Soft Matter Physics, Johannes Kepler University Linz, Linz, Austria; LIT Soft Materials Lab, Johannes Kepler University Linz, Linz, Austria

FB-2:L02 Finite Element Models of Soft Energy Harvesters based on Piezoelectric Polymers

R. DENZER, Division of Solid Mechanics, Lund University, Lund, Sweden

Session FB-3

Applications of flexible/stretchable electronics

FB-3:L01 Reflectance Oximetry Enabled by Flexible Organic Array of Printed Devices

Y. KHAN, D. HAN, A. PIERRE, J. TING, **A.C. ARIAS**, University of California at Berkeley, Berkeley, CA, USA

FB-3:L02 Biomaterial Lasers and Optical Waveguides

M. HUMAR, J. Stefan Institute, Ljubljana, Slovenia; Faculty of Mathematics and Physics, University of Ljubljana, Ljubljana, Slovenia

FB-3:L03 Soft Transducers having Stretchable and Flexible CNT Electrodes

SEIKI CHIBA, Chiba Science Institute, CEO, Tokyo, Japan; M. WAKI, CEO, Wits Inc., Tochiji, Japan; M. TAKESHITA, M. UEJIMA, CNT Lab., Zeon Corporation, Kawasaki, Japan

FB-3:L04 Achieving Unprecedented Operation Frequencies with Printed Polymer Transistors

M. CAIRONI, Center for Nano Science and Technology @PoliMi, Istituto Italiano di Tecnologia, Milano, Italy

FB-3:L05 Soft Bioresorbable Electronic Device for Brain Tumour Therapy

DAE-HYEONG KIM, Center for Nanoparticle Research, Institute for Basic Science, Seoul National University, Seoul; and School of Chemical and Biological Engineering, Seoul National University, Seoul, South Korea

FB-3:L06 Materials and Processing Challenges toward Flexible E-Textiles Systems

J.S. JUR, A.C. MYERS, I. KIM, B. LI, E. COBARRUBIAS, C. KNOWLES, B. JU, W. INGRAM, NC State University, Wilson College of Textiles, Department of Textile Engineering, Chemistry and Science, Raleigh, NC, USA

FB-3:L07 Flexible and Reliable Organic Solar Cell for Wearable Electronics

KENJIRO FUKUDA¹, Z. JIANG^{1,2}, K. YU¹, R. LIU¹, S. RICH¹, M. TAKAKUWA^{1,3}, T. SOMEYA^{1,2}, ¹RIKEN, Wako, Saitama, Japan; ²The University of Tokyo, Japan; ³Waseda University, Japan

FB-3:L08 Ultra-thin Flexible Materials for Large Area Microelectronic Integration and Motile Microrobotics

O.G. SCHMIDT, Institute for Integrative Nanosciences, Leibniz IFW Dresden, Germany

FB-3:L09 Functionalized Nanoscale-crack based Sensors for Wearable Electronics

TAE-IL KIM, School of Chemical Engineering, Sungkyunkwan University (SKKU), Suwon, South Korea

SYMPOSIUM FC

RESEARCH ADVANCES ON MICRO/NANO SYSTEMS AND THEIR APPLICATIONS

Keynote Lecture

FC:KL1 High Performance Flexible and Printed Electronics

R. DAHIYA, Bendable Electronics and Sensing Technologies (BEST) Group, James Watt School of Engineering, University of Glasgow, Glasgow, UK

Session FC-1

Physical MEMS/NEMS

FC-1:IL01 From High-voltage Power Dource to Plasma-induced ion Mobility Sensor for Mid-IR Gas Identification

JIANXIONG ZHU, Electrical and Computer Engineering, National University of Singapore, Singapore

FC-1:IL02 MEMS Cantilever Sensors

E. PEINER, Technische Universität Braunschweig, Institute of Semiconductor Technology (IHT), and Laboratory for Emerging Nanometrology (LENA), Braunschweig, Germany

FC-1:IL03 Multifunctional Platforms on Paper

R. MARTINS^{1,2}, D. GASPAR², I.M. MENDES¹, A.C. MARQUES¹, A. PIMENTEL¹, D. NUNES¹, L. PEREIRA^{1,2}, E. FORTUNATO^{1,2}, ¹3N/CENIMAT, Department of Materials Science, Faculty of Science and Technology, Universidade NOVA de Lisboa and CEMOP/UNINOVA, Caparica, Portugal; ²AlmaScience, Caparica, Portugal

FC-1:IL04 Non-silicon 3D Integrated Surface Micromachining for Near-zero-power and Flexible MEMS Devices Applications

ZHUOQING YANG, Shanghai Jiao Tong University (SJTU), Shanghai, China

FC-1:IL05 Tuneable Opto-NEMS Resonators

U. EMRE ALI¹, G. MODI², R. AGARWAL², **H. BHASKARAN**¹, ¹University of Oxford, Oxford, UK; ²University of Pennsylvania, USA

Keynote Lecture

FC:KL2 (Porous) Silicon NanoPhotonics: Applications, Opportunities and Challenges

G. BARILLARO, Dipartimento di Ingegneria dell'Informazione, Università di Pisa, Pisa, Italy

Session FC-2

Chemical micro/nano-sensors and systems

FC-2:IL01 Monitoring Integration Processes of Individual Single-walled Carbon Nanotubes into Sensors by Raman Spectroscopy

M. HALUSKA, S. JUNG, C. ROMAN, C. HIEROLD, Micro and Nanosystems ETH Zürich, Zurich, Switzerland

FC-2:IL02 Nanocomposites based on RGO decorated with Colloidal Au Nanoparticles for Electrochemical Sensors

C. INGROSSO, M. CORRIGELLI, N. DEPALO, A. AGOSTIANO, M. STRICCOLI, M.L. CURRI, CNR-IPCF, c/o Dept. of Chemistry, Università di Bari, Italy; A. TESTOLIN, V. PIFFERI, L. FALCIOLA, Dept. of Chemistry, Università degli Studi di Milano, Milano, Italy; F. BETTAZZI, I. PALCHETTI, Dept. of Chemistry Ugo Schiff, Università di Firenze, Firenze, Italy; A. DISHA, A. AGOSTIANO, E. FANIZZA, M.L. CURRI, Dept. of Chemistry, Università di Bari, Bari, Italy

FC-2:IL03 Integration of Colloidal Nanocrystals in Functional Superstructures: Emerging Opportunities for Micro- and Nanofabrication

M. LUCIA CURRI, Dipartimento di Chimica, Università degli Studi di Bari Aldo Moro, Bari, Italy

FC-2:IL04 Biocompatible Micro-biosensor and Biofuel Cell for In-vivo Use

Y. HUANG, T. UEN, **MADOKA TAKAI**, Department of Bioengineering, School of Engineering, The University of Tokyo, Bunkyo-ku, Japan

FC-2:IL05 Catalytic and Electrical Nanocontacts to Nanowires as Sensing Components and Site-specific Reactions

A.M. LORD, Q.M. RAMASSE, Centre for NanoHealth, Swansea University, Swansea, UK; D.M. KEPAPTOGLOU, SuperSTEM Laboratory, SFTC Daresbury Campus, Daresbury, UK

FC-2:IL06 Graphene-based Polymer Composites for Electromechanical Piezoresistive Sensors: General Aspects and Practical Considerations
TRAN TUNG, School of Chemical Engineering, The University of Adelaide, North Terrace, Adelaide, SA, Australia; and ARC Research Hub for Graphene Enabled Industry Transformation, The University of Adelaide, North Terrace, Adelaide, SA, Australia

FC-2:IL07 Novel Nanocomposite Plasmonic Sensors for Biomedical Applications

B. MIRANDA^{1,2}, S. DE MARTINO³, R. MORETTA¹, P. DARDANO¹, I. REA¹, C. FORESTIERE², L. DE STEFANO¹, ¹Institute for Microelectronics and Microsystems, Napoli, Italy; ²DIETI, Università degli Studi di Napoli "Federico II", Napoli, Italy; ³Materias s.r.l., Napoli, Italy

Session FC-3**Smart micro-nano systems and components integration**

FC-3:IL01 Near-Zero Power Integrated Microsystems for the IoT
M. RINALDI, SMART Center, Northeastern University, Boston, MA, USA

FC-3:IL02 CMOS-compatible Silicon Nanowire Sensors with Readout Integrated Circuits for pH Applications
KUN ZHOU, **ZHEYAO WANG**, Institute of Microelectronics, Tsinghua University, Beijing, China

FC-3:IL03 Integrated Design and Positioning Control of Multi-electrode Ultrasonic Linear Piezoelectric Actuator and Capacitive Position Sensor
JIE-LIN HO, Department of Mechanical and Electro-Mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan, R.O.C; **YU-JEN WANG**, Department of Mechanical and Electro-Mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan, R.O.C

FC-3:IL04 Fine Tuning of Active Elements of Microwire-based Magnetic Sensors

A. CHIZHIK, J. GONZALEZ, Universidad del País Vasco, UPV/EHU, San Sebastián, Spain; A. ZHUKOV, Universidad del País Vasco, UPV/EHU, San Sebastián, Spain & IKERBASQUE, Basque Foundation for Science, Bilbao, Spain; A. STUPAKIEWICZ, Laboratory of Magnetism, University of Białystok, Białystok, Poland; P. GAWRONSKI, AGH Univ. of Science and Technology, Faculty of Physics and Applied Computer Science, Krakow, Poland

Session FC-4**Radio frequency MEMS**

FC-4:IL01 Acousto-optic MEMS for Space Applications
M. RAIS-ZADEH, NASA Jet Propulsion Laboratory, Pasadena, CA, USA

FC-4:IL02 Metamaterials Based RF Microsystems for Telecommunication Applications
E. PROIETTI, **G.M. SARDI**, G. CAPOCCIA, R. MARCELLI, CNR-IMM, Roma, Italy; G. BARTOLUCCI, University of Roma "Tor Vergata", Roma, Italy

FC-4:IL03 Silicon Based Gigh Q RF MEMS Resonant Devices for Wireless Communication
QUAN YUAN, Institute of Semiconductors, CAS, Beijing, China

FC-4:IL04 Electrical Measurements & Instruments Using Weakly Coupled Micromechanical Resonators
HONGLONG CHANG, Northwestern Polytechnical University, Xi'an, China

Session FC-5**Energy harvesting and power supply MEMS**

FC-5:IL01 Flexible Multifunctional Nanogenerators Based on Biodegradable Materials
XIAOSHENG ZHANG, School of Electronic Science and Engineering, University of Electronic Science and Technology of China, Chengdu, China

FC-5:IL02 Piezoelectric Vibration Energy Harvesters Using Piezoelectric Thin Films
ISAKU KANNO, Kobe University, Kobe, Japan

FC-5:IL03 Flexible and Multi-functional Human Machine Interfaces Using Self-powered Triboelectric Mechanism

QIONGFENG SHI, CHENGKUO LEE, Center for Intelligent Sensors and MEMS, Electrical and Computer Engineering, National University of Singapore, Singapore

Session FC-6**Micro(nano)fluidics and Lab on Chip****FC-6:IL01 Integrated Microfluidic Organ-on-chip Devices for Medical Applications**

J. SAMITIER, Nanobioengineering Group, Institute for Bioengineering of Catalonia (IBEC-BIST), Barcelona, Spain; Centro de Investigación Biomédica en Red en Bioingeniería, Biomateriales y Nanomedicina (CIBER-BBN), Zaragoza, Spain; Department of Electronic and Biomedical Engineering, University of Barcelona, Barcelona, Spain

FC-6:IL02 Nanofluidics: A New Arena for Materials Science

YAN XU, Department of Chemical Engineering, Graduate School of Engineering, Osaka Prefecture University, Osaka, Japan, Japan Science and Technology Agency (JST), PRESTO, Japan NanoSquare Research Institute, Osaka Prefecture University, Osaka, Japan

SYMPOSIUM FD**RECENT ADVANCES IN MULTIFERROIC AND MAGNETOELECTRIC MATERIALS AND APPLICATIONS****Session FD-1****Theory and modeling of multiferroics**

FD-1:IL01 Polar Materials with Noncollinear Order
SHUAI DONG, School of Physics, Southeast University, Nanjing, China

FD-1:IL02 High Pressure Synthesis and Characterization of Novel Magnetoelectric Multiferroics
E. GILIOLI, D. DELMONTE, IMEM-CNR, Parma, Italy

FD-1:IL03 Magnetoelectric Effect in Ferromagnetic - Multiferroic - Ferromagnetic Structures

U. LALETIN, N. PODDUBNAYA, Institute of Technical Acoustics of National Academy of Sciences of Belarus, Vitebsk, Belarus

Session FD-2**Non-oxide multiferroics**

FD-2:IL01 Multiferroicity in Hexagonal Rare Earth Ferrites
XIAOSHAN XU, University of Nebraska, Lincoln, NE, USA

FD-2:IL02 Room-temperature Magnetoelectric Effect in a Liquid Crystal
H. UEDA, Paul Scherrer Institut, Villigen, Switzerland; T. AKITA, Y. UCHIDA, T. KIMURA, University of Tokyo, Kashiwa, Chiba, Japan

Session FD-3**Materials synthesis and processing**

FD-3:IL01 Freestanding Crystalline Monolayers of Oxide Perovskite Multiferroics
YUEFENG NIE, Nanjing University, Nanjing, China

FD-3:IL02 Strain Gradient Mediated Magnetoelectric Effects in Composite Polymer/Inorganic Multiferroic Films

A. NICOLENCO, Institute of Applied Physics, Chisinau, Moldova/Dept. Física, Univ. Autònoma de Barcelona, Spain; E. MENÉNDEZ, J. FORNELL, E. Pellicer, Dept. Física, Univ. Autònoma de Barcelona, Spain; A. GÓMEZ, Institut de Ciència de Materials de Barcelona, Campus UAB, Spain; X.-Z. CHEN, S. PANÉ, Multi-Scale Robotics Lab, Institute of Robotics & Intelligent Systems, ETH Zurich, Switzerland; **J. SORT**, Institució Catalana de Recerca i Estudis Avançats, Barcelona, Spain/Dept. Física, Univ. Autònoma de Barcelona, Spain

FD-3:IL03 Preparation of Single Crystalline BiFeO₃ Thin Films and Their Electronic and Atomic Structures Studied by Synchrotron Radiation

SEIJI NAKASHIMA, Y. FUCHIWAKI, M. SHIMIZU, H. FUJISAWA, University of Hyogo, Himeji, Japan; T. HIGUCHI, Tokyo University of Science, Tokyo, Japan; N. HAPPO, Hiroshima City University, Hiroshima, Japan; Y. YAMAMOTO, R. MATSUMOTO, K. KIMURA, K. HAYASHI, Nagoya Institute of Technology, Nagoya, Japan

FD-3:IL04 Unique Magnetoelectric Responses from Square Cupola Magnetic Units

KENTA KIMURA, T. KATSUYOSHI, T. KIMURA, Department of Advanced Materials Science, The University of Tokyo, Kashiwa, Japan; P. BABKEVICH, H.M. RONNOW, Laboratory for Quantum Magnetism, Institute of Physics, École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland; M. TOYODA, Department of Physics, Tokyo Institute of Technology, Meguro-ku, Tokyo, Japan; K. YAMAUCHI, ISIR-SANKEN, Osaka University, Ibaraki, Japan; Y. SAWADA, S. KIMURA, Center for Advanced High Magnetic Field Science (AHMF), Osaka University, Osaka, Japan

FD-3:IL05 Structural Transitions between Metastable Phases in Bismuth-Containing Perovskite Multiferroics

A.N. SALAK¹, J.P. CARDOSO¹, D. DELMONTE², E. GILIOLI², V.V. SHVARTSMAN³, D.D. KHALYAVIN⁴, ¹Department of Materials and Ceramics Engineering and CICECO - Aveiro Institute of Materials, University of Aveiro, Aveiro, Portugal; ²Institute of Materials for Electronics and Magnetism, Parma, Italy; ³Institute for Materials Science and CENIDE - Center for Nanointegration Duisburg-Essen, University of Duisburg-Essen, Essen, Germany; ⁴ISIS Facility, Rutherford Appleton Laboratory, Chilton, Didcot, Oxfordshire, UK

Session FD-4

Multiferroic nanostructures, self-assembly and nanocomposites

FD-4:IL01 A journey into the Tunable Antiferromagnetic Spin Textures of BiFeO₃

J. FISCHER, S. FUSIL, **M. BIBES**, V. GARCIA, CNRS-Thales, Palaiseau, France; A. HAYKAL, V. JACQUES, Univ. Montpellier, France

FD-4:IL02 Multiferroic Properties in GaFeO₃-type Thin Films

MITSURU ITOH, S. YASUI, Tokyo Institute of Technology, Yokohama, Japan; T. KATAYAMA, The University of Tokyo, Tokyo, Japan

FD-4:IL03 Self-assembly Growth of Multiferroic Topological Nanoislands Array

Ji MA¹, JING WANG¹, HUA ZHOU², QINGHUA ZHANG³, YUHAN LIANG¹, MINGFENG CHEN¹, LIN GU³, BEN XU¹, JINXING ZHANG⁴, JING MA¹, **CE-WEN NAN**¹, ¹State Key Lab of New Ceramics and Fine Processing, School of Materials Science and Engineering, Tsinghua University, Beijing, China; ²School of Physics, Shandong University, Jinan, China; ³Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Science, Beijing, China; ⁴Department of Physics, Beijing Normal University, Beijing, China

FD-4:IL04 Growth and Functionalities in Vertically Aligned Multiferroic Oxide Nanocomposites

AIPING CHEN, Y. SHARMA, K.T. KANG, Center for Integrated Nanotechnologies (CINT), Los Alamos National Laboratory, Los Alamos, NM, USA

FD-4:IL05 Strain Effect on Magnetoelectric Coupling of Epitaxial NFO/PZT Heterostructure

YAJUN QI, Z. ZHENG, P. ZHOU, T. ZHANG, Key Laboratory of Green Preparation and Application for Materials, Ministry of Education, Hubei Provincial Key Laboratory of Polymers, Department of Materials Science and Engineering, Hubei University, Wuhan, China

Session FD-5

Magnetoelectric characterization and electric field control of magnetization

FD-5:IL01 Nanomagnetism of Magnetoelectric Granular Thin-film Antiferromagnets

D. MAKAROV, Helmholtz-Zentrum Dresden-Rossendorf e.V., Dresden, Germany

FD-5:IL02 Nanoscale Magnetoelectric Effects Revealed by High-resolution Imaging

M. GHIDINI, University of Parma, Parma, Italy; Diamond Light Source, UK; University of Cambridge, UK

FD-5:IL03 Potential Magnetoelectric Spin Textures at Oxide Interfaces

K. DÖRR, M. KOCH, L. BERGMANN, D. RATA, A. HERKLOTZ, Institute of Physics, MLU Halle-Wittenberg, Germany

FD-5:IL04 Electric-field Induced Magneto-ionic Control of Magnetism in Highly Porous Iron Oxide Films and Nanostructures

A. NICOLENCO, Departament de Física, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain and Institute of Applied Physics, Chisinau, Moldova; S. ROBBENOLT, M. CIALONE, Departament de Física, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain; G. RIUS, Institute of Microelectronics of Barcelona, IMB-CNM-CSIC, Campus UAB, Cerdanyola del Vallès, Spain; J. SORT, Departament de Física, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain and Institució Catalana de Recerca i Estudis Avançats, Barcelona, Spain

FD-5:IL05 Magnetoelectric Coupling by Piezoelectric Tensor Design

M.S. RZCHOWSKI, J. IRWIN, S. LINDEMANN, W. MAENG, J.M. HU, C.B. EOM, University of Wisconsin-Madison, Madison, WI, USA; J.J. WANG, L.Q. CHEN, Penn State University, USA; V. VAITHYANATHAN, D.G. SCHLOM, Cornell University, Ithaca, NY, USA

FD-5:IL06 Electric Field Control of Spin Pumping in Y₃Fe₅O₁₂ Thin Film

PENG ZHOU, Y. QI, T. ZHANG, Key Laboratory of Green Preparation and Application for Materials, Ministry of Education, Hubei Provincial Key Laboratory of Polymers, Dept. of Materials Science and Engineering, Hubei University, Wuhan, China; J. ZHANG, College of Electrical and Information Engineering, Zhengzhou University of Light Industry, Zhengzhou, China; G. SRINIVASAN, Physics Dept., Oakland University, Rochester, MI, USA

FD-5:IL07 EuS/Hf_{0.5}Zr_{0.5}O₂ Bilayers as a Prospective Multiferroic System

A. KHANAS¹, S. ZARUBIN¹, Y. MATVEYEV², A. TALDENKOV³, **A. ZENKEVICH**¹, ¹Moscow Institute of Physics and Technology (State University), Dolgoprudny, Moscow region, Russia; ²DESY, Hamburg, Germany; ³NRC "Kurchatov Institute", Moscow, Russia

FD-5:IL08 Localized Spin Excitation in Hexagonal RMnO₃ (R = rare earths)

Ji-YEON NAM, SEUNG KIM, **IN-SANG YANG**, Department of Physics, Ewha Womans University, Seoul, South Korea

Session FD-6

Domain walls and dynamics of multiferroics

FD-6:IL01 Optical Magnetoelectric Effect in Multiferroics

YOUTAROU TAKAHASHI, Department of Applied Physics and Quantum Phase Electronics Center (QPEC), University of Tokyo, Tokyo, Japan; RIKEN Center for Emergent Matter Science (CEMS), Saitama, Japan

FD-6:IL02 Interface Ferroionic States in Multiferroic Tunnel Junctions

J. SANTAMARIA, GFMC, Departamento de Física de Materiales, Universidad Complutense de Madrid, Madrid, Spain

FD-6:IL03 Flexo-photovoltaic Effect and its "Effects"

MARIN ALEXE, University of Warwick, Department of Physics, Coventry, UK

FD-6:IL04 Modeling of Antiferromagnetic Domain Reversal in Cr₂O₃

A. PARTHASARATHY, New York University, New York, NY, USA; S. RAKHEJA, University of Illinois at Urbana-Champaign, Urbana, IL, USA

Session FD-7

New effects

FD-7:IL01 Non-linear Magnetoelectric Interactions and Electric Field Control of Magnetism in Ferrimagnetic Oxides

Y. LIU, HONGWEI QU, **G. SRINIVASAN**, Oakland University, Rochester, MI, USA; M. POPOV, I.V. ZAVISLYAK, Taras Shevchenko National University of Kyiv, Ukraine; P. ZHOU, T. ZHANG, Hubei University, Hubei, China; M. PAGE, Air Force Research Lab., Dayton, OH, USA

FD-7:IL02 Electrocaloric Effect in Multiferroic Materials

V.V. SHVARTSMAN, D. LEWIN, D.C. LUPASCU, Institute for Materials Science, University of Duisburg-Essen, Essen, Germany

FD-7:IL03 Tailored Magnetostrictive Multilayers for Magnetoelectric Sensors

D. MEYERS, Inorganic Functional Materials, Institute for Materials Science, Faculty of Engineering, Kiel University, Kiel, Germany

FD-7:IL04 High-frequency Molecular Dynamics Simulations of the Electrocaloric Effect in Ferroelectric PbTiO₃

S. LISENKOV, University of South Florida, Tampa, FL, USA

FD-7:IL05 Multiferroics: New Developments and Trends

A. LOIDL, Center for Electronic Correlations and Magnetism, University of Augsburg, Augsburg, Germany

FD-7:IL06 Ferroelectric - Magnetoelectric: Known Structures - Unknown Properties

N.N. PODDUBNAYA, V.M. LALETSIN, Institute of Technical Acoustics of the National Academy of Sciences of Belarus, Vitebsk, Belarus

FD-7:IL07 Electrically Excited Magnetoelectric Magnetic Field Sensors

E. QUANDT, Inorganic Functional Materials, Institute for Materials Science, Faculty of Engineering, Kiel University, Kiel, Germany

SYMPOSIUM FE

FUNCTIONAL NANOMATERIALS FOR NEW GENERATION SOLID STATE CHEMICAL SENSORS

Session FE-1

Carbon nanostructures-based gas sensors

FE-1:IL01 Gas Sensing of NiO-SCCNTs Core-shell Heterostructures: Optimization by Radial Modulation of the Hole-accumulation Layer

M.H. RAZA¹, **K. MOVLAE^{2,3}**, **S.G. LEONARDI³**, **N. BARSAN⁴**, **G. NERI³**, **N. PINNA¹**, ¹Institut für Chemie and IRIS Adlershof, Humboldt-Universität zu Berlin, Berlin, Germany; ²Center of Excellence in Electrochemistry, School of Chemistry, College of Science, University of Tehran, Iran; ³Department of Engineering, University of Messina, Messina, Italy; ⁴Institute of Physical and Theoretical Chemistry, University of Tübingen, Tübingen, Germany

FE-1:IL02 Chemical Design of Carbon-based Nanostructures for Sensing Applications

A. SINITSKII, University of Nebraska at Lincoln, Lincoln, NE, USA

FE-1:IL03 Low Power Consumption Gas Sensors with Decorated Carbon Nanotubes and Graphene Based Hybrid Materials

S. MOSHKALEV, UNICAMP, Campinas, SP, Brazil

FE-1:IL04 Gas Sensing Performance of 2D-Layered Nanomaterials at Low Operating Temperature

M. SHAFIEI, Faculty of Science, Engineering and Technology, Swinburne University of Technology, Hawthorn, VIC, Australia

Session FE-2

Semiconductor metal oxides-based gas sensors

FE-2:IL01 Functionalization of Semiconducting Metal-Oxide Nanostructures for Gas Sensors

Z.Z. OZTURK, **O. ALEV**, **A. KILIÇ**, **S. BÜYÜKKÖSE**, Gebze Technical University, Faculty of Basic Sciences, Dept. of Physics, Gebze, Kocaeli, Turkey

FE-2:IL02 Liquid Metals for the Synthesis of Gas Sensitive Materials

K. KALANTAR-ZADEH, School of Chemical Engineering, University of New South Wales (UNSW), Sydney, Australia

FE-2:IL03 3D Nanostructuring of Low-Power Chemical Sensors

A. TRICOLI, Nanotechnology Research Laboratory, Australian National University, Canberra, Australia

FE-2:IL04 Improvement of Sensing Properties of Semiconductor Gas Sensors by Controlling Gas Diffusivity and Reactivity

YASUHIRO SHIMIZU, **T. HYODO**, Graduate School of Engineering, Nagasaki University, Nagasaki, Japan

FE-2:IL05 Resonant Devices and Nanomaterials in Gas Sensing Applications

N. DONATO, Dept. of Engineering, University of Messina, Messina, Italy

FE-2:IL06 Nanostructured Metal Oxide Based Multivariable Chemical Sensors

M.A. CARPENTER, College of Engineering, SUNY Polytechnic Institute, Utica, NY, USA

FE-2:IL07 High-temperature Resistive Gas Sensors Based on ZnO/SiC Nanocomposites

A. GASKOV, **M. RUMYANTSEVA**, **V. PLATONOV**, Chemistry Dept., Moscow State University, Moscow, Russia

FE-2:IL08 Electrical Behavior and Gas Sensor Properties of p-type Co3O4-based Materials

M.N. RUMYANTSEVA, S.A. VLADIMIROVA, K.YA. PRIKHODKO, K.E. KOZLOVSKAYA, P.S. KUTUKOV, A.M. GASKOV, Chemistry Department, Moscow State University, Moscow, Russia

FE-2:IL09 A CuO/SiO2 Nanocomposite for Highly Selective H2S Gas Sensing

A. PAUL, **C. WEINBERGER**, **T. WAGNER**, **M. TIEMANN**, Paderborn University, Department of Chemistry, Paderborn, Germany

FE-2:IL10 Titanium Based Material for High-temperature Gas Sensor in Harsh Environment Application

R. LONTIO FOMEKONG, **B. SARUHAN**, Institute of Materials Research, German Aerospace Center, Cologne, Germany

Session FE-3

Novel 2D inorganic materials-based gas sensors

FE-3:IL01 Highly sensitive NO2 gas sensor based on Au-incorporated WO3 and SnS2 nanograins with porous SiO2 nanorods

SOO YOUNG KIM¹, **HO WON JANG²**, ¹Dept. of Materials Science and Engineering, Korea University, Seoul, South Korea; ²Dept. of Materials Science and Engineering, Research Institute of Advanced Materials, Seoul National University, Seoul, South Korea

FE-3:IL02 2D Materials for Gas Sensors

L. OTTAVIANO, Dipartimento di Scienze Fisiche e Chimiche, Università dell'Aquila, L'Aquila, Italy

Session FE-4

Enzyme-free sensors based on functional nanomaterials

FE-4:IL01 Capacitive and light-addressable field-effect devices for biosensor applications

M.J. SCHOENING, FH Aachen, Institute of Nano- and Biotechnologies, Juelich, Germany

FE-4:IL02 Optical Detection of Chemicals and Biological Entities on Gold Nanostuctured Solid Supports

R.E. IONESCU, Light, Nanomaterials and Nanotechnology, Institute Charles Delaunay FRE-CNRS 2019, University of Technology of Troyes, Troyes, France

FE-4:IL03 Nanoparticle Networks for Label-free Biosensing

D. TSOUKALAS, **E. SKOTADIS**, Dept. of Applied Sciences, National Technical University of Athens, Athens; **G. TSEKENIS**, Biomedical Research Foundation of the Academy of Athens, Athens, Greece

FE-4:IL04 Gamma Rays Irradiated WO3 for Electrochemical Sensing of Depressive Biomarkers

C. SEKAR, **N. LAVANYA**, **A.C. ANITHAA**, Dept. of Bioelectronics & Biosensors, Alagappa University, Karaikudi, TN, India

Session FE-5

Nanocomposite/hybrid/heterostructure-based chemical- and bio-sensors

FE-5:IL01 Gas sensors based on metal oxide nano-heterostructures

E. LLOBET, **È. Navarrete**, MINOS-EMaS, Universitat Rovira i Virgili, Tarragona, Spain

FE-5:IL02 Tin Dioxide Based Nanocomposite for Electrochemical and Gas Sensing Applications

N. LAVANYA, Dept. of Electronic Engineering, University of Messina, Messina, Italy; Dept. of Bioelectronics & Biosensors, Alagappa University, Karaikudi, TN, India

FE-5:IL03 Self-sensing Ionic Soft Actuator Based on Graphene Woven Mesh Electrode

R. TABASSIAN¹, **V.H. NGUYEN¹**, **S. UMRAO¹**, **M. MAHATO¹**, **J. KIM¹**, **M. PORFIRI²**, **IL-KWON OH¹**, ¹Creative Research Initiative Center for Functionally Antagonistic Nano-Engineering, Dept. of Mechanical Engineering, KAIST, Daejeon, South Korea; ²Dept. of Mechanical and Aerospace Engineering, and Dept. of Biomedical Engineering, Tandon School of Engineering, New York University, Brooklyn, NY, USA

FE-5:IL04 MWCNTs Based Smart Fabrics for Wearable Gas Sensors

R.T. RAJENDRA KUMAR, Advanced Materials and Devices Laboratory (AMD), Dept. of Nanoscience and Technology, Bharathiar University, Coimbatore, India

SYMPOSIUM FF

ELECTROMAGNETIC METAMATERIALS AND METASURFACES: RECENT RESEARCH ACHIEVEMENTS AND NEW PARADIGMS

Session FF-1

Physics and modelling of metadevices

FF-1:IL01 New Trends for Hybrid Metamaterials and Metasurfaces

M. LAPINE, University of Technology Sydney, Ultimo, Australia

FF-1:IL02 Around the Plasmonic Nanoparticle Cycle: From a New Chiral Optical Effect to Applications in Quantum Optics

V.K. VALEV, Department of Physics, University of Bath, Bath, UK

FF-1:IL03 Microwave and Optical Responses of Magnetolectric Materials: Fundamental Similarities and Differences in Natural and Metamaterial Structures

E.O. KAMENETSKII, Ben Gurion University of the Negev, Beer Sheva, Israel

FF-1:IL04 Thermal Radiation Management by Means of Nanoantennas

M. CENTINI^{1,2}, **M.C. LARCIPRETE**¹, **R. LI VOTI**¹, **M. BERTOLOTTI**¹, **C. SIBILIA**¹, **M. ANTEZZA**^{1,2,3}, ¹Sapienza University of Rome, Department of Basic and Applied Sciences for Engineering, Rome, Italy; ²Laboratoire Charles Coulomb (L2C), UMR 5221 CNRS-Université de Montpellier, Montpellier, France; ³Institut Universitaire de France, Paris, France

FF-1:IL05 Some Recent Developments in Non-Hermitian Metamaterials

V. GALDI, Department of Engineering, University of Sannio, Benevento, Italy

FF-1:IL06 Theory of Plasmonic Open Systems Derived from First Principles

SHIYI XIAO¹, **JING LIN**², **MENG QIU**¹, **XIYUE ZHANG**¹, **QIONG HE**², **LEI ZHOU**², ¹Key laboratory of Specialty Fiber Optics and Optical Access Networks, Joint International Research Laboratory of Specialty Fiber Optics and Advanced Communication, Shanghai University, Shanghai, China; ²Department of Physics, Fudan University, Shanghai, China

Session FF-2

New concepts and new materials

FF-2:IL01 Smart Metamaterials and Metasurfaces

TIE JUN CUI, State Key Laboratory of Millimeter Waves, Southeast University, Nanjing, China

FF-2:IL02 Nanopillars Arrays as Anisotropic Metamaterials and Metasurfaces

A.V. LAVRINENKO¹, **E. SHKONDIN**¹, **O. TAKAYAMA**¹, **R. MALUREANU**¹, **M. E. ARYAE PANAH**¹, **O.Y. YERMAKOV**², **A.A. BOGDANOV**², **S. CHATTERJEE**³, **G. STRANGI**³, ¹Technical University of Denmark, Kgs. Lyngby, Denmark; ²ITMO University, Saint Petersburg, Russia; ³Case Western Reserve University, Cleveland, USA

FF-2:IL03 Lithium Niobate Metasurfaces for Nonlinear Light Sources

T. PERTSCH, Abbe Center of Photonics, Friedrich Schiller University Jena, Jena, Germany

Session FF-3

Mie-resonant nanophotonics

FF-3:IL01 Mie Metasurfaces with van der Waals Hyperbolic-medium Antennas and Nanostructures

V. BABICHEVA, Department of Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM, USA

FF-3:IL02 Multipole Analysis of All-dielectric Nanostructures and Metasurfaces Supporting High-quality Optical Resonances

A.B. EVLYUKHIN, Institute of Quantum Optics, Leibniz Universität Hannover, Hannover, Germany

FF-3:IL03 Artificial Chirality Evolution in Micro-/Nano-scale 3D Plasmonic Metamaterials

JUNSU RHO, Pohang University of Science and Technology (POSTECH), Pohang, South Korea

Session FF-4

Functional metasurfaces

FF-4:IL01 Nonlinear Photonic Metasurfaces

GUIXIN LI, Southern University of Science and Technology, Shenzhen, China

FF-4:IL02 Dynamic Evolution: Temporally Modulated Metasurfaces for Extreme Control of Light and Electromagnetic Radiation

XUCHEN WANG, **A. DÍAZ RUBIO**, **V. ASADCHY**, **G. PITTCYN**, **M. MIRMOOSA**, **S. TRETYAKOV**, Department of Electronics and Nanoengineering, Aalto University, Espoo, Finland

FF-4:IL03 Angular Dispersions in Plasmonic Metasurfaces

XIYUE ZHANG, **QI LI**, **FEIFEI LIU**, **MENG QIU**, **SHULIN SUN**, **QIONG HE**, **LEI ZHOU**, State Key Laboratory of Surface Physics, Key Laboratory of Micro and Nano Photonic Structures (Ministry of Education), and Department of Physics, Fudan University, Shanghai, China

FF-4:IL04 Novel Devices Based on Active and Tunable Dielectric Nanoantennas

A.I. KUZNETSOV, Institute of Materials Research and Engineering, A*STAR (Agency for Science, Technology and Research), Singapore

FF-4:IL05 Metamaterials-nanofluidics Hybrid Device for Ultra-high-sensitive IR Spectroscopy

TAKUO TANAKA, Metamaterials Laboratory, RIKEN Cluster for Pioneering Research Innovative Photon Manipulation Research Team, RIKEN Center for Advanced Photonics Institute of Post-LED Photonics, Tokushima University, Wako, Saitama, Japan

Session FF-5

Quantum and topological meta-optics and active metamaterials

FF-5:IL01 Topologically Protected Transport in Photonic Crystals

M.I. SHALAEV, **W. WALASIK**, **N.M. LITCHINITSER**, Duke University, Durham, NC, USA

FF-5:IL02 Quantum Circuit

F.A. BOVINO, Dipt. SBAI, University of Rome "La Sapienza", Rome, Italy

FF-5:IL03 Time-bandwidth Unlimited Topological Photonics

K.L. TSAKMAKIDIS, Solid State Physics section, Department of Physics, National and Kapodistrian University of Athens, Panepistimioupolis, Athens, Greece

FF-5:IL04 Nonlinear Optical Switching and Tunability in AlGaAs Nanoantennas and Metasurfaces

C. DE ANGELIS, **D. ROCCO**, Department of Information Engineering, University of Brescia, Brescia, Italy

SYMPOSIUM FG

ADVANCES IN INORGANIC LUMINESCENT MATERIALS AND APPLICATIONS

Session FG-1

Physics and modelling of luminescent materials

FG-1:IL01 Accelerating Phosphor Discovery and Development through Data Science

SHYUE PING ONG¹, **Z. WANG**¹, **J. HA**¹, **Y.H. KIM**², **S. LI**³, **Y. XIA**³, **M. AMACHRAA**¹, **N.T. HUNG**⁴, **R.-J. XIE**³, **W.B. IM**², **J. MCKITTRICK**¹, ¹University of California at San Diego, La Jolla, CA, USA; ²Chonnam National University, South Korea; ³Xiamen University, China; ⁴Tohoku University, Japan

FG-1:IL02 Electron Transfer between Lanthanide Impurities: Insights from Multiconfigurational Calculations

J.J. JOOS, LumiLab, Department of Solid State Sciences, Ghent University, Ghent, Belgium; **Z. BARANDIARÁN**, **L. SEIJO**, Departamento de Química, Instituto Universitario de Ciencia de Materiales Nicolás Cabrera, and Condensed Matter Physics Center (IFIMAC), Universidad Autónoma de Madrid, Madrid, Spain

FG-1:IL03 TL and OSL as Research Tools in Luminescence: Possibilities and Limitations

E.G. YUKIHARA, Department of Radiation Safety and Security, Paul Scherrer Institute, Villigen PSI, Switzerland

FG-1:IL04 Theoretical Discussion of Mn⁴⁺ Luminescence

M.G. BRIK^{1,2,3}, A.M. SRIVASTAVA⁴, M. PIASECKI³, ¹College of Sciences, Chongqing University of Posts and Telecommunications, Chongqing, China; ²Institute of Physics, University of Tartu, Tartu, Estonia; ³Institute of Physics, Jan Dlugosz University, Czeszochowa, Poland; ⁴Srivastava consulting LLC, Niskayuna, NY, USA

FG-1:IL05 Design of Eu²⁺ based Phosphors using Quantum Chemical Calculations

W. URLAND, Private Institute of Theoretical Chemical Physics, Muralto, Switzerland

Session FG-2

Phosphors and low dimensional materials for lighting and displays

FG-2:IL01 Sensitization of Ceramic Eu³⁺ Activated Luminescent Materials for Solid State Lighting

T. JÜSTEL, F. BAUR, Münster University of Applied Sciences, Steinfurt, Germany

FG-2:IL02 Ceramic Color Converters for Laser-Driven Solid State Lighting

RONG-JUN XIE, Lishuxing College of Materials, Xiamen University, Xiamen, China; **LE WANG**, College of Optical and Electronic Technology, China Jiliang University, Hangzhou, Zhejiang, China

FG-2:IL03 Utilizing Deep-red Emitting Mn⁴⁺ Phosphors for Horticultural Lighting

F. BAUR, T. JÜSTEL, Münster University of Applied Sciences, Steinfurt, Germany

FG-2:IL04 Direct Laser Patterning as a Possible Strategy for Spatially Controlled QDs Formation

F. ANTOLINI, F. LIMOSANI, R. CARCIONE, ENEA C.R. Frascati, Rome, Italy; **L. ORAZI**, Department of Science and Methods for Engineering, University of Modena and Reggio Emilia, Reggio Emilia, Italy; **J. HARWELL**, T. SAJJAD, I.D.W. SAMUEL, University of St. Andrews, St. Andrews, UK

FG-2:LO5 Al₂O₃-Ce:YAG and Al₂O₃-Ce:(Y,Gd)AG Composite Ceramic Phosphors for High-power LEDs

D.Yu. KOSYANOV, **A.A. VORNOVSKIKH**, Far Eastern Federal University, Vladivostok, Russia; **X. LIU**, J. LI, Key Laboratory of Transparent Opto-functional Inorganic Materials, Shanghai Institute of Ceramics, CAS, Shanghai, China and Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, Beijing, China; **R.P. YAVETSKIY**, Institute for Single Crystals of NAS of Ukraine, Kharkiv, Ukraine; **V.YU. MAYOROV**, V.G. KURYAVYI, Institute of Chemistry, Far Eastern Branch, Russian Academy of Sciences, Vladivostok, Russia

Session FG-3

Scintillator and upconversion materials

FG-3:IL01 Tailored Upconversion Nanocrystals Optimized for High Quantum Yield or Efficient Energy Transfer

C. HOMANN, **C. DREES**, **A.N. RAJ**, **R. KURRE**, **J. PIEHLER**, **M. HAASE**, University of Osnabrück, Osnabrück, Germany; **K. BUSCH**, University of Münster, Germany; **L. KRUEKOWITZ**, **F. FRENZEL**, **B. GRAUEL**, **C. WÜRTH**, **U. RESCH-GENGER**, **BAM**, Berlin, Germany; **J. BOLZE**, Panalytical, Almelo, The Netherlands

FG-3:IL02 Upconversion Nanoparticles in Nanobiomedicine

J.A. CAPOBIANCO, Concordia University, Department of Chemistry and Biochemistry and Centre for Nanoscience Research, Montreal, Quebec, Canada

FG-3:IL03 Multiphoton Fluorescence Upconversion with Hetero-structured 2D Colloidal Nanocrystals

A.H. KHAN^{1,2}, **G.H.V. BERTRAND**², **A. TEITELBOIM**³, **A. POLOVITSYN**², **J. PLANELLÉS**⁴, **J.I. CLIMENTE**⁴, **D. ORON**³, **I. MOREELS**^{1,2}, ¹Department of Chemistry, Ghent University, Ghent, Belgium; ²Istituto Italiano di Tecnologia, Genova, Italy; ³Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot, Israel; ⁴Departament de Química Física i Analítica, Universitat Jaume I, Castelló de la Plana, Spain

FG-3:LO4 High Responsivity Broadband Photodetection with Electrostatically Conjugated MoS₂-upconversion Nanoparticles

S. CHATTOPADHYAY, Institute of Biophotonics, National Yang-Ming University, Taipei, Taiwan

Session FG-4

Sensing and imaging

FG-4:IL01 Thermometry Through Luminescent Nanoparticles

L.D. CARLOS, Physics Department and CICECO-Aveiro Institute of Materials, University of Aveiro, Campus Universitário de Santiago, Aveiro, Portugal

FG-4:IL02 Cr³⁺ doped Materials as Excellent Optical Thermometer in NIR Region

SETSUHISA TANABE, M. BACK Graduate School of Human & Environmental Studies, Kyoto University, Kyoto, Japan

FG-4:IL03 Multi-wavelength Lanthanide-based Nanoparticles for Biomedical and Beyond Applications

E. HEMMER, University of Ottawa, Department of Chemistry and Biomolecular Sciences, Ottawa, Ontario, Canada

FG-4:LO4 Transparent Chalcogenide Ceramics for IR Applications

R. GAUME, College of Optics and Photonics, NanoScience Technology Center, Townes Laser Institute, University of Central Florida, Orlando, FL, USA

FG-4:LO5 Eu(III) and Tb(III) Complexes For Biosensing Applications

F. PICCINELLI, C. DE ROSA, M. BETTINELLI, Luminescent Materials Laboratory, University of Verona, Verona, Italy

Session FG-5

Chemi-, bio-, sono-, thermo- and mechano-luminescence

FG-5:IL01 Smart and Sensitive Energy Storage Phosphors

P.F. SMET, D. VAN DER HEGGEN, S. MICHELS, A. FENG, J.J. JOOS, LumiLab, Ghent University, Ghent, Belgium

FG-5:LO2 Multiple defects in persistent phosphors: don't ignore the thermally inaccessible traps!

D. VAN DER HEGGEN, J.J. JOOS, P.F. SMET, LumiLab, Ghent University, Ghent, Belgium; **D. VANDENBERGHE**, J. DE GRAVE, Laboratory of Mineralogy and Petrology, Ghent University, Ghent, Belgium

FG-5:IL03 Development of Novel Chemiluminescent Materials for Cancer Treatment

L. PINTO DA SILVA, Chemistry Research Unit (CIQUP), Faculty of Sciences of University of Porto (FCUP), Porto, Portugal

FG-5:LO4 Using Triboluminescent Materials to Detect Impacts and Radiation Exposure in Adverse Environments

W.A. HOLLERMAN, Department of Physics, University of Louisiana at Lafayette, Lafayette, LA, USA

Session FG-6

Light management and luminescent materials integration in devices

FG-6:IL01 Simulating Outcoupling and Radiation Patterns from Luminescent Materials in Lighting Applications

Y. MEURET, A. CORREIA, KU Leuven Department of Electrical Engineering (ESAT), Light&Lighting Laboratory, Ghent, Belgium

FG-6:IL02 Innovative Photocatalyst Anode using Nanoparticle Deposition for Artificial Photosynthesis

YOSHIHIKO IMANAKA, Fujitsu Laboratories Ltd., Atsugi, Kanagawa, Japan

FG-6:LO3 Optimal Quantum Dot Luminescent Solar Concentrator Double and Triple Tandem Structures Based on Ray Tracing Simulations

T.A. DE BRUIN, **W.G.J.H.M. VAN SARK**, Utrecht University, Utrecht, The Netherlands

FG-6:LO4 Investigation of Rare-Earth Doped Zinc Oxide Thin Films

A. AXELEVITCH, Holon Institute of Technology (HIT), Holon, Israel; **M. SHATALOV**, Ariel University, Ariel, Israel

FG-6:LO5 Growth and Characteristics of Novel Single Crystals for Electro-optical Applications

KIYOSHI SHIMAMURA, E.G. VÍLLORA, Optical Single Crystals Group, National Institute for Materials Science, Tsukuba, Ibaraki, Japan

FG-6:IL06 Nanomaterials and Molecular Photoanodes for Light-driven Water Splitting

J. LI, F. SONG, L. REITH, K. LIENAU, C.A. TRIANA, **G.R. PATZKE**, University of Zurich, Department of Chemistry, Zurich, Switzerland

FG-6:L07 Flexible Ring Laser that is Made of an Organic-inorganic Composite

MITSUNORI SAITO, A. KUBOTA, Ryukoku University, Otsu, Japan

Session FG-7**Medical applications and bioimaging**

FG-7:IL01 New Insight on photochemistry of lanthanide-doped LaPO₄
AN-JUN HUANG, P.A. TANNER, **KA-LEUNG WONG**, Department of Chemistry, Hong Kong Baptist University, Kowloon Tong, Hong Kong

FG-7:IL02 Time-gated Infrared Luminescence for Medical Imaging
D. POELMAN¹, E. COSAERT¹, B. NIMMEGEERS¹, J. DU¹, T. CARBONATI², D. MERONI², ¹LumiLab, Dept. Solid State Sciences, Ghent University, Ghent, Belgium; ²Dipartimento Chim., University of Milan, Milan, Italy

FG-7:IL03 Lanthanide-doped Nanoparticles for Applications in Theranostics

F. VETRONE, Institut National de la Recherche Scientifique, Centre Énergie, Matériaux et Télécommunications, Université du Québec, Varennes, Canada

FG-7:L04 Ceramic-clad Single-mode Ti:sapphire Crystalline Fibers
T.I. YANG, **SHENG-LUNG HUANG**, National Taiwan University, Taipei, Taiwan; P.S. YEH, National Taiwan University of Science and Technology, Taipei, Taiwan

FH - 4th International Conference

**EMERGING MATERIALS,
TECHNOLOGIES AND APPLICATIONS
FOR NON-VOLATILE MEMORY
DEVICES**

Session FH-1**Emerging applications for non volatile memories and memristive devices**

FH-1:IL01 Redox-based Memristive Switching Phenomena from Physics to Neuromorphic Applications

R. WASER^{1,2}, R. DITTMANN², S. MENZEL², I. VALOV², D. WOUTERS¹, ¹IWE2, RWTH Aachen University, Aachen, Germany; ²JARA-FIT & PGI-7 & PGI-10, Forschungszentrum Jülich, Jülich

FH-1:IL02 Neuromorphic Applications of Silicon Oxide RRAM

A.J. KENYON, A. MEHONIC, W.H. NG, M. BUCKWELL, D. JOKSAS, D. MANNION, L. ZHAO, H. COX, Department of Electronic & Electrical Engineering, University College London, London, UK

FH-1:IL03 Memristive Electronic Synapses made by Anodic Oxidation
S. CHEN^{1,2,3}, S. NOORI⁴, M.A. VILLENA^{1,5}, Y. SHI⁶, T. HAN¹, Y. ZUO¹, M.P. PEDEFERRI⁴, D.B. STRUKOV², **M. LANZA**¹, M.V. DIAMANTI⁴, ¹Institute of Functional Nano and Soft Materials, Collaborative Innovation Center of Suzhou Nanoscience & Technology, Soochow University, Suzhou, China; ²Dept. of Electrical and Computer Engineering, University of California at Santa Barbara, Santa Barbara, CA, USA; ³Institute of Materials in Electrical Engineering and Information Technology 2 (IWE2), RWTH Aachen University, Aachen, Germany; ⁴Dept. of Chemistry, Materials and Chemical Engineering "G. Natta", Politecnico di Milano, Milan, Italy; ⁵Dept. of Electrical Engineering, Stanford University, Stanford, CA, USA; ⁶IMEC, Leuven, Belgium

FH-1:L04 A Transient Biomemristor Based on Collagen

N. RAEIS-HOSSEINI, C. PAPAVALSILIOU, Imperial College London, London, UK

FH-1:L05 Resistive Switching Behavior of Lateral and Vertical MoS₂ Devices

Z. GENG¹, C. ZIEBOLD¹, S. THIELE¹, M. MIKOLASEK², J. BREZA², J. PEZOLDT¹, M. ZIEGLER¹, **F. SCHWIERZ**¹, ¹Technische Universität Ilmenau, Germany; ²Slovak University of Technology Bratislava, Slovakia

FH-1:IL06 From Resistive Switching in Mott Insulators to Mott Memory and Artificial Neuron

E. JANOD, B. CORRAZE, J. TRANCHANT, L. CARIO, **M.-P. BESLAND**, Institut des Matériaux Jean Rouxel, Université de Nantes, UMR CNRS, Nantes, France

FH-1:IL07 Analog Behavior of Programmable Metallization Cell Devices

M.N. KOZICKI, N. CHAMELE, M. BALABAN, Y. GONZALEZ VELO, School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ, USA

FH-1:IL08 Radiation Effects on ReRAM/CBRAM Technology

Y. GONZALEZ VELO, M.N. KOZICKI, School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ, USA

FH-1:L09 Large Scale Technology Platform and Methodology for a Targeted Process Optimization of Memristive Devices

SEONGAE PARK, T. IVANOV, S. KLETT, B. VOLLAND, M. ZIEGLER, TU Ilmenau, Ilmenau, Germany

FH-1:IL10 Single-element Phase Change Memory

M. SALINGA, Westfälische Wilhelms-Universität Münster, Münster, Germany

FH-1:IL11 Chalcogenide Materials for Innovative Phase-Change Memories and Ovonic Threshold Switching Selector Devices

P. NOÉ¹, J.-Y. RATY^{1,2}, F. D'ACAPITO³, F. HIPPERT⁴, N. BERNIER¹, J.-B. JAGER⁵, P. KOWALCZYK¹, A. VERDY¹, J.-B. DORY¹, ¹Univ. Grenoble Alpes, CEA, LETI, MINATEC campus, Grenoble, France; ²CESAM-Physics of Solids Interfaces and Nanostructures, B5, Université de Liège, Belgium; ³CNR-IOM-OGG c/o ESRF - The European Synchrotron, Grenoble, France; ⁴CNRS, Grenoble INP, LMGP, Univ. Grenoble Alpes, Grenoble, France; ⁵Univ. Grenoble Alpes, CEA, IRIG, MINATEC campus, Grenoble, France

FH-1:L12 Phase-change Material Integrated Tunable Nanoantenna for all-photonic Memory and Computing Applications

E. GEMO, S. GARCIA-CUEVAS CARRILO, J. FANCA, C. RUIZ DE GALARRETA, A. BALDYCHEVA, C.D. WRIGHT, University of Exeter, Exeter, UK; W.H.P. PERNICE, University of Muenster, Muenster, Germany; H. BHASKARAN, University of Oxford, Oxford, UK

FH-1:L13 Femtosecond Laser Modification of GST225 Amorphous Thin Films: Crystallization, Re-Amorphization, Ablation, and Ripple Formation

S. KOZYUKHIN, T. KUNKEL, Kurnakov Institute of General and Inorganic Chemistry, RAS, Moscow, Russia; P. LAZARENKO, YU. SYBINA, National Research University of Electronic Technology, Zelenograd, Russia; M. SMAYEV, Mendelev University of Chemical Technology of Russia, Moscow, Russia; Yu. VOROBYEV, Ryazan State Radio Engineering University, Ryazan, Russia

FH-1:L14 Selective MOCVD Growth of Sb-Te and In-Ge-Te Nanostructures on Templated Substrates for Phase Change Memories

R. CECCHINI, C. MARTELLA, A. LAMPERTI, S. BRIVIO, M. LONGO, CNR-IMM, Unit of Agrate Brianza, Agrate Brianza (MB), Italy; F. ROSSI, L. LAZZARINI, CNR-IMEM, Parma, Italy; E. VARESI, Micron Semiconductor Italia Srl, Vimercate (MB), Italy

FH-1:L15 Resistive and Reflective Switching Induced by Structural Change in MnTe Semiconductor Films

SHUNSUKE MORI, D. ANDO, Y. SUTOU, Tohoku Univ., Sendai, Miyagi, Japan

FH-1:IL16 Impact of Stoichiometry and Interface Configuration on the Retention and the Switching Speed of Memristive SrTiO₃ Cells

C. BÄUMER, S. SIEGEL, F. HENSLING, T. HEISIG, A. GUTSCHE, S. MENZEL, **R. DITTMANN**, PGI-7, Research Center Jülich, Jülich, Germany

FH-1:IL17 Oxygen and Grain-boundary Engineered HfO_x Based Memristive Devices

L. ALFF, Institute of Materials Science, Technische Universität Darmstadt, Darmstadt, Germany

FH-1:L18 Noise Properties of Oxygen Engineered Hafnium Oxide-Based Resistive Random Access Memory Devices for Non-volatile Memory and Neuromorphic Applications

E. PIROS¹, M. LONSKY², S. PETZOLD¹, J. MÜLLER², L. ALFF¹, ¹Institute of Materials Science, Advanced Thin Film Technology, Technische Universität Darmstadt, Darmstadt, Germany; ²Institute of Physics, Goethe-University Frankfurt, Frankfurt am Main, Germany

FH-1:L19 Engineering of PrxCa1-xMnO₃ Based Interface Type Resistive Switching Devices for Neuromorphic Applications

A. GUTSCHE, J. ZHANG, S. HMABSCH, R. DITTMANN, Peter Grünberg Institut (PGI-7&10), Forschungszentrum Jülich GmbH, Jülich, NRW, Germany

FH-1:L20 Current Transients in Self-rectified Forming-free Non-Filamentary ReRAM Cells Based on Ta₂O₅/Ta Interface

D. KUZMICHEV, A. MARKEEV, Moscow Institute of Physics and Technologies, Dolgoprudny, Moscow Region, Russia

FH-1:L21 Selective Activation of Memristive Interfaces in TaOx-based Devices by Controlling Oxygen Vacancies Dynamics at the Nanoscale
M.J. SÁNCHEZ¹, C. FERREYRA², M. AGUIRRE^{3,4,5}, C. ACHA⁶, S. BENGIÓ², J. LECOURT⁷, U. LUDERS⁷, D. RUBI², ¹Centro Atómico Bariloche and Instituto Balseiro, San Carlos de Bariloche, Argentina; ²GlyA and INN-CONICET, CNEA, San Martín, Buenos Aires, Argentina; ³INN-CONICET; ⁴Departamento de Física de Materia Condensada, Universidad de Zaragoza, Zaragoza, Spain; ⁵Laboratorio de Microscopías Avanzada (LMA), Instituto de Nanociencia de Aragón (INA)-Universidad de Zaragoza, Zaragoza, Spain; ⁶Instituto de Ciencias de Materiales de Aragón (ICMA), Universidad de Zaragoza, Zaragoza, Spain; ⁷Depto. de Física, FCEyN, Universidad de Buenos Aires and IFIBA, UBA-CONICET, Pab I, Ciudad Universitaria, Buenos Aires, Argentina.; ⁷CRISMAT, CNRS UMR 6508, ENSICAEN, Caen Cedex, France

FH-1:L22 The Resistive Switching in Pt/ZnO/CuO/Al Bilayer Device
 P.S. SUBIN¹, K.J. SAJI^{1,2}, S. JAYALEKSHMI^{1,3}, **M.K. JAYARAJ**^{1,3}, ¹Centre of Excellence in Advanced Materials, Cochin University of Science and Technology; ²International School of Photonics, Cochin University of Science and Technology; ³Department of Physics, Cochin University of Science and Technology Kochi, Kerala, India

FH-1:IL23 Two-dimensional Chalcogenides for Advanced Memory Applications
A.V. KOLOBOV, Herzen University, St. Petersburg, Russia; P. FONS, Y. SAITO, J. TOMINAGA, AIST, Japan

FH-1:IL24 Switching in Interfacial Phase Change Memory Materials
R.E. SIMPSON, J. NING, B. TAI, M. TAJIK, J. MARTINEZ, S. YANG, Singapore University of Technology and Design, Singapore

FH-1:L25 Layered Chalcogenide and Pnictide Films for Phase Change Memory Applications
YUTA SAITO^{1,2}, P. FONS¹, A.V. KOLOBOV^{1,3}, K.V. MITROFANOV¹, K. MAKINO¹, J. TOMINAGA¹, S. HATAYAMA⁴, Y. SUTOU⁴, M. HASE⁵, J. ROBERTSON², ¹National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; ²University of Cambridge, UK; ³Herzen State Pedagogical University of Russia, Russia; ⁴Tohoku University, Japan; ⁵University of Tsukuba, Japan

FH-1:L26 Growth, Structure and Properties of van der Waals-layered Ge-Sb-Te Thin Films for Innovative Phase-Change Memory Applications
 P. KOWALCZYK¹, **F. HIPPERT**², F. D'ACAPITO³, N. BERNIER¹, D. TÉRÉBÉNEC¹, N. CASTELLANI¹, J.-B. JAGER⁴, C. MOCUTA⁵, P. NOÉ¹, ¹Univ. Grenoble Alpes, CEA, LETI, Grenoble, France; ²CNRS, Grenoble INP, LMGP, Univ. Grenoble Alpes, Grenoble, France; ³CNR-IOM-OGG c/o ESRF - The European Synchrotron, Grenoble, France; ⁴Univ. Grenoble Alpes, CEA, IRIG, Grenoble, France; ⁵Synchrotron SOLEIL, Gif-sur-Yvette, France

FH-1:L27 High Quality Sb₂Te₃ Thin Films Grown by Metal Organic Chemical Vapor Deposition
M. RIMOLDI, R. CECCHINI, C. WIEMER, A. LAMPERTI, E. LONGO, CNR-IMM Unit of Agrate Brianza, Agrate Brianza, Italy; L. NASI, L. LAZZARINI, CNR-IMEM, Parma, Parma, Italy; R. MANTOVAN, M. LONGO, CNR-IMM Unit of Agrate Brianza, Agrate Brianza, Italy

FH-1:L28 Shape Controlled Self-assembly of Core Shell Ge-Sb-Te/Sb₂Te₃ Nanowires by MOCVD
A. KUMAR, R. CECCHINI, C. WIEMER, C. MARTELLA, M. LONGO, CNR-IMM Unit of Agrate Brianza, Agrate Brianza, Italy; M. SCUDERI, G. NICOTRA, CNR-IMM Headquarters, Catania, Italy

FH-1:L29 Non-bulk Resistance Variation Phase Change Material for PCRAM Application
YI SHUANG, D. ANDO, Y. SUTOU, Graduate School of Engineering, Tohoku University, Sendai, Japan

Session FH-2

Magnetic, ferroelectric and multiferroic materials for memory devices

FH-2:IL01 Resistive Switching in Ferroelectric Perovskites
I. FINA, Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, Bellaterra, Catalonia, Barcelona, Spain

FH-2:IL02 Fluid Imprint in Ferroelectric La:HfO₂ Capacitors
A. GRUVERMAN¹, P. BURAGOHAIN¹, A. ERICKSON², T. MITTMANN³, P. KARIUKI³, C. RICHTER³, T. SCHENK⁴, T. MIKOLAJICK³, U. SCHROEDER³, ¹Dept. of Physics and Astronomy, University of Nebraska, Lincoln, NE, USA; ²Dept. of Mechanical and Materials Engineering, University of Nebraska, Lincoln, NE, USA; ³NaMLab gGmbH/TU Dresden, Dresden, Germany; ⁴Materials Research and Technology Department, Luxembourg Institute of Science and Technology, Belvaux, Luxembourg

FH-2:L03 Features of Charge Trap Evolution during Endurance of Ferroelectric HfZrO and HfO₂:La Thin Films
O.M. ORLOV, G.Ja. KRASNIKOV, JSC MERI, Zelenograd, Moscow, Russia; D.R. ISLAMOVI, V.A. GRITSSENKO, ISP SB RAS, Novosibirsk, Russia

FH-2:L04 A High-coercivity Non-volatile Thin-film Magnet Based on the Shell-FM Effect
A. ÇAKIR, Department of Metallurgical and Materials Engineering, Mugla Sıtkı Koçman University, Mugla, Turkey; M. ACET, M. FARLE, Physics, Duisburg-Essen University, Duisburg, Germany

FH-2:IL05 Electric Field Control of Magnetism in Spintronics Devices
L. HERRERA DIEZ¹, Y.T. LIU¹, D.A. GILBERT^{2,3}, M. BELMEGUENAI⁴, A. BERNARD MANTEL⁵, L. RANNO⁵, J. VOGEL⁵, S. PIZZINI⁵, A. LAMPERTI⁶, S. ONO⁷, J. LANGER⁸, B. OCKER⁸, D. RAVELOSONA¹, ¹Centre de Nanosciences et de Nanotechnologies, CNRS, Univ. Paris-Sud, Université Paris-Saclay, C2N - Palaiseau, Orsay cedex, France; ²NIST Center for Neutron Research, National Institute of Standards and Technology, Gaithersburg, MD, USA; ³Department of Materials Science and Engineering, University of Tennessee, Knoxville, TN, USA; ⁴Laboratoire des Sciences des Procédés et des Matériaux, CNRS-UPR 3407, Université Paris 13, Sorbonne Paris Cité, Villetaneuse, France; ⁵Univ. Grenoble Alpes, CNRS, Institut Néel, Grenoble, France; ⁶IMM-CNR, Unit of Agrate Brianza, Agrate Brianza (MB), Italy; ⁷Central Research Institute of Electric Power Industry, Yokosuka, Kanagawa, Japan; ⁸Singulus Technology AG, Kahl am Main, Germany

FH-2:IL06 A Multifunctional Standardized Magnetic Tunnel Junction Stack Embedding Sensor, Memory and Oscillator Functionalities
I.L. PREJBEANU¹, A. CHAVENT¹, V. IURCHUK¹, L. TILLIE¹, Y. BEL¹, N. LAMARD¹, L. VILA¹, U. EBELS¹, R.C. SOUSA¹, B. DIENY¹, G. DI PENDINA¹, G. PRENAT¹, J. LANGER², J. WRONA², ¹Univ. Grenoble Alpes, CEA, CNRS, Grenoble INP*, IRIG-Spintec, Grenoble, France, ^{*}Institute of Engineering, Univ. Grenoble Alpes; ²Singulus Technologies AG, Kahl am Main, Germany

FH-2:IL07 New Insight of Degradation and TDD of Super-thin MgO in STT-MRAM
KIN-LEONG PEY, J.H. LIM, N. RAGHAVAN, Singapore University of Technology and Design, Singapore

Session FH-3

Emerging applications for non-volatile memories and memristive devices

FH-3:IL01 Spintronic Devices for Neuromorphic and Probabilistic Computing
SHUNSUKE FUKAMI, Research Institute of Electrical Communication, Tohoku University, Sendai, Japan

FH-3:IL02 Photonic-spintronic Neuromorphic Computing Systems
F. MORADI, H. FARKHANI, J. PELLOUX-PRAYER, Aarhus University, Aarhus, Denmark

FH-3:IL03 Organic Spintronic Multilevel Resistive Switching Devices as Synapses for Neuromorphic Computing
A. RIMINUCCI¹, P. NEHA¹, P. GRAZIOSI¹, R. LEGENSTEIN², ¹Institute for the study of Nanostructured Materials, CNR, Bologna, Italy; ²Institute for Theoretical Computer Science, Graz University of Technology, Graz, Austria

FH-3:IL04 Deep Neural Network Inference Using Computational Phase Change Memory
A. SEBASTIAN, IBM Research - Zurich, Rueschlikon, Switzerland

FH-3:L05 Storing and Retrieving Data in Mem-Processors
A. ASCOLI¹, R. TETZLAFF¹, I. MESSARIS¹, S.-M. KANG², L.O. CHUA³, ¹Faculty of Electrical and Computer Engineering, Technische Universität Dresden, Dresden, Germany; ²Jack Baskin School of Engineering, University of California Santa Cruz, Santa Cruz, CA, USA; ³Department of Electrical Engineering and Computer Sciences, University of California Berkeley, Berkeley, CA, USA

FH-3:IL06 Ferroelectric Memories for Neuromorphic Computing
S. SLESAZECK, H. MULAOSMANOVIC, E.T. BREYER, NaMLab gGmbH, Dresden, Germany; T. MIKOLAJICK, NaMLab gGmbH and Chair of Nanoelectronic Materials, Technical University Dresden, Dresden, Germany

FH-3:IL07 Energy Efficient Neuromorphic Computing using Resistive Switching Memories
M. MARINELLA, S. AGARWAL, C. BENNETT, P. XIAO, R. JACOBS-GEDRIM, D. HUGHART, E. FULLER, A. TALIN, Sandia National Laboratories, Albuquerque, NM, USA

FH-3:IL08 Memory-based Neuromorphic Hardware for Advanced Neural Network Models
D.B. STRUKOV, University of California Santa Barbara, Goleta, CA, USA

FH-3:L09 Impact of Distinct Select Transistors on the Working of HfO₂ and HfAlO Based Memristive Devices Fabricated Using 130 nm CMOS Technology

M. KALISHETTYHALLI MAHADEVAIAH¹, E. PEREZ¹, E. PEREZ-BOSCH QUESADA¹, M. LISKER¹, C. WENGER^{1,2}, A. MAI^{1,3}, ¹IHP-Leibniz-Institut für innovative Mikroelektronik, Frankfurt (Oder), Germany; ²Brandenburg medical School Theodor Fontane, Neuruppin, Germany; ³University of Applied Science Wildau, Wildau, Germany

FH-3:IL10 Memristive Devices for On-chip Learning in Neural Network

M. ZIEGLER, Micro and Nano Electronic Systems, Technical University Ilmenau, Ilmenau, Germany

FH-3:IL11 RRAM for Neuromorphic Spiking Neural Network Demonstration

A. REGEV, A. BRICALLI, Weebit-nano, Hod Hasharon, Israel

FH-3:L12 Impact of Memristive Switching Dynamics on Spiking Neural Network Operation

S. BRIVIO, S. SPIGA, CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy

FH-3:IL13 Physic Based Simulation of RRAM for Neural Network Applications

S. MENZEL, Forschungszentrum Jülich, Peter Grünberg Institut (PGI-7), Jülich, Germany

FH-3:L14 Evaluation of the Suitability of HfO₂/TiO_x Analogue Memristive ReRAM Devices as Synapses in Artificial Neural Networks

F. CÜPPERS*, S. MENZEL, A. HARDTDEGEN, S. HOFFMANN-EIFERT, Peter Grünberg Institute (PGI 7&10) and JARA-Fit, Forschungszentrum Jülich GmbH, Jülich, Germany; M. VON WITZLEBEN, C. BENDEL, U. BÖTTGER, R. WASER, Institute of Materials in Electrical Engineering and Information Technology II and JARA-Fit, RWTH Aachen University, Aachen, Germany

FH-3:L15 Continuum Model of Charge Transport in Dielectrics: Heat Generation and Trapped-charge Intrinsic Field Effects on the Charge Distribution and Current in Stationary and Strongly Non-stationary Cases

D.R. ISLAMOV, ISP SB RAS, Novosibirsk, Russia; A.A. CHERNOV, A.A. PIL'NIK, ITP SB RAS, Novosibirsk, Russia

SYMPOSIUM FI

GRAPHENE AND OTHER EMERGING 2D-LAYERED NANOMATERIALS: SYNTHESIS, PROPERTIES AND POTENTIAL APPLICATIONS

Session FI-1

Physical and chemical properties and structural and electronic characterization

FI-1:IL01 Moiré Superlattices in Twisted Homo- and Heterobilayers of Transition Metal Dichalcogenides

V. FALKO, National Graphene Institute, Manchester, UK

FI-1:IL02 Nanometer-scale Characterization and Control of Two-dimensional Materials with Atomic Force Microscopy

M.R. ROSENBERGER, U.S. Naval Research Laboratory, Washington, DC, USA

FI-1:IL03 Two-dimensional Topological Polymers

T.-J. LIU, M. SPRINGER, A. KUC, Y. JING, **T. HEINE**, TU Dresden, Dresden, Germany

FI-1:IL04 In situ Transmission Electron Microscopy of 2D Nanomaterials

D.V. GOLBERG, Queensland University of Technology (QLD), Brisbane, Australia

FI-1:IL05 Quantum Hall Effect in Graphite Films

A. MISHCHENKO, Department of Physics and Astronomy, The University of Manchester, Manchester, UK

FI-1:L06 New Way of Conceiving the Structure of Graphene

J. NIEWIADOMSKA-KAPLAR, Scientific Publishing House Tab, Rome, Italy

FI-1:L07 Layered Graphene/Functionalized-GeC van der Waals heterostructures

M. IDRESS¹, B. AMIN², **C.V. NGUYEN³**, ¹Department of Physics, Hazara University, Mansehra, Pakistan; ²Department of Physics, Abbottabad University of Science and Technology, Abbottabad, Pakistan; ³Department of Materials Science and Engineering, Le Quy Don Technical University, Ha Noi, Vietnam

FI-1:L08 Structure-dependency on the Photoelectrochemical Performance of Two-dimensional Transition Metal Dichalcogenides

PS. TÓTH, MTA Premium Post Doctorate Research Program, Department of Physical Chemistry and Materials Science, University of Szeged, Szeged, Hungary; G. SZABÓ, C. JANÁKY, Department of Physical Chemistry and Materials Science, University of Szeged, Szeged, Hungary

FI-1:L09 Embedding Epitaxial (blue) Phosphorene in between Device-Compatible Functional Layers

C. GRAZIANETTI, **G. FARAONE**, C. MARTELLA, A. MOLLE, CNR-IMM, Unità di Agrate Brianza, Agrate Brianza (MB), Italy; G. FARAONE, E. BONERA, Dipartimento di Scienza dei Materiali, Università di Milano-Bicocca, Milan, Italy

FI-1:L10 Electronic, Optical and Photocatalytic Properties of Surface-functionalized GeC Monolayer: First Principles Calculations

T.V. VAN¹, **N.N. HIEU²**, ¹Institute for Computational Science, Ton Duc Thang University, Ho Chi Minh City, Viet Nam; ²Institute of Research and Development, Duy Tan University, Da Nang, Vietnam

Session FI-2

Novel properties

FI-2:IL01 Synthesis and Novel Properties of 2D Layered semiconductors and their Heterostructures

WEN-HAO CHANG, Department of Electrophysics, National Chiao Tung University, Hsinchu, Taiwan

FI-2:IL02 Mechanical Properties of Graphene and 2D Material Reinforcements in Composites

I.A. KINLOCH, Dept. of Materials and National Graphene Institute, University of Manchester, Manchester, UK

FI-2:IL03 Josephson Junctions for Digital Applications

P. FEBVRE, Université Savoie Mont Blanc, Le Bourget du Lac, France

FI-2:IL04 Interlayer Excitons in Two-dimensional Transitions Metal Dichalcogenides

R. FRISENDA, A. CASTELLANOS GOMEZ, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC), Madrid, Spain

FI-2:IL05 Functionalizing 2D-layered Nanomaterials for Artificial Photosynthesis: Turning CO₂ into a Valuable Resource

LI-CHYONG CHEN^{1,2}, I. SHOWN³, YI-FAN HUANG³, HE-YUN DU^{1,2}, HSIANG-TING LIEN^{1,2}, YU-CHUNG CHANG¹, KUEI-HSIEN CHEN^{1,3}, ¹Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan; ²Center of Atomic Initiative for New Materials, National Taiwan University, Taipei, Taiwan; ³Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan

FI-2:L06 Optical Properties of 2D Transition Metal Carbides and Nitrides (MXenes)

K. MALESKI, **Y. GOGOTSI**, A.J. Drexel Nanomaterials Institute and Department of Materials Science and Engineering, Drexel University, Philadelphia, PA, USA

Session FI-3

Synthesis and processing

FI-3:IL01 Graphene Oxide Liquid Crystal and Relevant 2D Nanoscale Assembly

SANG OUK KIM, National Creative Research Initiative (CRI), Center for Multi-Dimensional Directed Nanoscale Assembly, Department of Materials Science & Engineering, KAIST, Daejeon, South Korea

FI-3:IL02 The Xene Generations: Details, Methods and Perspectives of Epitaxial Single-element Two-dimensional Materials

A. MOLLE, CNR-IMM, unit of Agrate Brianza, Agrate Brianza, Italy

FI-3:IL03 Synthetic Route Towards Pure Phase of WS₂ & MoS₂ Inorganic Nanotubes and their Unusual Properties

A. ZAK, S. GHOSH, C. PALLELLAPPA, HIT-Holon Institute of Technology, Holon, Israel; I. KAPLAN-ASHIRI, R. POPOVITZ-BIRO, Weizmann Institute of Science, Israel; T. LIVNEH, Nuclear Research Center, Negev, Israel; Y. ZHANG, Max Planck Institute for Solid State Research, Stuttgart, Germany; V. BRUSER, Leibniz Institute of Plasma, Germany

FI-3:IL04 **Mo4VC4: a Two-dimensional MXene with 5 Atomic Layers of Transition Metals**

C.E. SHUCK, G. DEYSHER, K. HANTANASIRISAKUL, K. MALESKI, A. SARYCHEVA, B. ANASORI, Y. GOGOTSI, A.J. Drexel Nanomaterials Institute, Drexel University, Philadelphia, PA, USA; N.C. FREY, A. FOUCHER, V.B. SHENOY, E.A. STACH, Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, USA

FI-3:IL05 **2D Multi-principal Element Carbides MXenes**

B. ANASORI, Department of Mechanical and Energy Engineering, Purdue School of Engineering, Indiana University, Purdue University Indianapolis, Indianapolis, IN, USA

FI-3:IL06 **2D Materials: Inorganic Nanotubes and Fullerene-like Nanoparticles, an Update**

R. TENNE, Weizmann Institute of Science, Rehovot, Israel

FI-3:IL07 **Engineering the Growth of CVD MoS₂ Layers by Pattern Design**

A. LAMPERTI, C. MARTELLA P.P. TUMMALA, A. MOLLE, IMM-CNR Unit of Agrate Brianza, Agrate Brianza (MB), Italy; L.G. NOBILI, Dipartimento di Chimica, Materiali e Ingegneria Chimica, Milano, Italy; P. TARGA, D. CODEGONI, F. TOIA, S. MARIANI, ST Microelectronics, Agrate Brianza (MB), Italy

Session FI-4

Integration processes of 2D layered materials in devices structures

FI-4:IL01 **Phase Engineering of Colloidal TMDs for Electrocatalysis and Energy Storage**

C. MATTEVI, Materials Department, Imperial College London, London, UK

FI-4:IL02 **Two-dimensional Superlattices for Electrochemical Energy Storage and Conversion**

PAN XIONG, Centre for Clean Energy Technology, School of Mathematical and Physical Sciences, University of Technology Sydney, NSW, Australia

FI-4:IL03 **Self-aligned Multichannel Graphene Nanoribbon Transistor Arrays**

SEONG-JUN JEONG, Department of Organic Materials and Fiber Engineering, Soongsil University, Seoul, South Korea

FI-4:IL04 **Wafer-scale Graphene for Photonics**

C. COLETTI, Center for Nanotechnology Innovation @ NEST, Istituto Italiano di Tecnologia, Pisa, Italy

FI-4:IL05 **Integration Processes of Graphene-based Van der Waals Heterostructures and their Terahertz Device Applications**

J.A. DELGADO-NOTARIO, Research Institute of Electrical Communications, Tohoku University, Sendai, Japan

FI-4:IL06 **Heteroassembly of Colloidal Graphene and Titania nanoseeds and Their Applications**

XINGKE CAI¹, R. MA², N. SAKAI², T. SASAKI², ¹Institute for Advanced Study, Shenzhen University, Shenzhen, Guangdong, China; ²International Center for Materials Nanoarchitectonics (WPI-MANA), National Institute for Materials Science (NIMS), Tsukuba, Ibaraki, Japan

Session FI-5

Novel characterizations routes

FI-5:IL01 **Modelling of Adsorption and Intercalation of Hydrogen on/into Layered WS₂ Nanostructures**

J.A. ALONSO, Dept. of Theoretical, Atomic and Optical Physics, University of Valladolid, Valladolid, Spain; A. LAIKHTMAN, A. ZAK, Faculty of Sciences, Holon Institute of Technology, Holon, Israel; H.R. MOON, Dept. of Chemistry, Ulsan National Institute of Science and Technology, Ulsan, South Korea; J.I. MARTINEZ, Materials Science Factory, Madrid Institute of Materials Science, CSIC, Madrid, Spain

FI-5:IL02 **Computational Discovery of Novel 2D Materials**

K.S. THYGESEN, CAMD and Center for Nanostructured Graphene (CNG), Department of Physics, Technical University of Denmark, Lyngby, Denmark

FI-5:IL03 **Computational and Experimental Approaches for Printed 2D-based Devices**

G. FIORI, University of Pisa, Dipartimento Ingegneria Informazione, Pisa, Italy

FI-5:IL04 **From the Atomic Structure to the Optoelectronic Properties Studies of 2D Materials via TEM**

R. ARENAL, Laboratorio Microscopias Avanzadas, INA, U. Zaragoza, Zaragoza, Spain; Fundacion ARAID, Zaragoza, Spain; Instituto de Ciencias de Materiales de Aragon, CSIC-U. Zaragoza, Zaragoza, Spain

Session FI-6

Application of 2D layered materials and composites

FI-6:IL01 **Electromagnetic Interference Shielding with MXenes**

CHONG MIN KOO, Korea Institute of Science and Engineering, Seoul, South Korea

FI-6:IL02 **Synergizing High Capacitance with Fast Charging in 2D Materials: Design and Mechanisms**

M.R. LUKATSKAYA, Department of the Mechanical and Process Engineering, ETH Zürich, Zürich, Switzerland

FI-6:IL03 **Flow Aligned Graphene Oxide Films and Membranes for Diverse Applications**

M. MAJUMDER^{1,2}, ¹Nanoscale Science and Engineering Laboratory (NSEL), Department of Mechanical & Aerospace Engineering, Monash University, Clayton, Australia; ²ARC Research Hub on Graphene Enabled Industry Transformation, Monash University, Clayton, Australia

FI-6:IL04 **VLS Growth of 2D Metal Chalcogenides and their Application in Artificial Photosynthesis**

KUEI-HSIEN CHEN, I. SHOWN, M.F. TSENG, F.Y. LIN, M.C. CHANG, IAMS, Academia Sinica, Taipei, Taiwan; P.H. HO, L.C. CHEN, CCMS, National Taiwan University, Taipei, Taiwan; P.W. CHIU, Department of Electrical Engineering, National Tsing-Hua University, Hsinchu, Taiwan

FI-6:IL05 **Free-standing Janus GO-rGO Films for Humidity Sensors and Actuators**

SEUL-YI LEE, R.L. MAHAJAN, Department of Mechanical Engineering and the Institute for Critical Technology and Applied Science, Virginia Tech, Blacksburg, VA, USA

FI-6:IL06 **High-performance Flexible Broadband Photodetectors Based on 2D Hafnium Selenosulfide Nanosheets**

R.K. ULAGANATHAN¹, R. SANKAR^{1,2}, F.-C. CHOU^{1,3}, ¹Center for Condensed Matter Sciences, National Taiwan University Taipei, Taiwan; ²Institute of Physics, Academia Sinica, Taipei, Taiwan; ³Taiwan Consortium of Emergent Crystalline Materials, Ministry of Science and Technology, Taipei, Taiwan

FI-6:IL07 **Graphene-supported 2D Metal Oxides for Low Temperature PROX**

L. MICHEL, G. GENAY, A. DEMANGE, S. SALL, **V. CAPS**, Institut de Chimie et des Procédés pour l'Energie, l'Environnement et la Santé (ICPEES), UMR CNRS 7515, Université de Strasbourg, Strasbourg, France

FI-6:IL08 **Graphene Nanostructures Synthesized by Self-propagating High Temperature Synthesis and their Composites based of Aluminum and Butadiene-nitrile Rubber**

A.A. VOZNIKOVSKII, S.V. KIDALOV, St. Petersburg, Russia; A.P. VOZNIKOVSKII, Institute of Synthetic Rubber, St. Petersburg, Russia

FI-6:IL09 **Multifunctional Foams Based on Bio-based Polymers and Graphene Nanoplatelets**

M. ANTUNES, F. FAKHOURI, V.REALINHO, J.I. VELASCO, Department of Materials Science and Metallurgy, Technical University of Catalonia (UPC BarcelonaTech), The School of Industrial, Aerospace and Audiovisual Engineering of Terrassa (ESEIAT), Terrassa (Barcelona), Spain

FI-6:IL10 **High Voltage Aqueous Symmetric Supercapacitor based on Nitrogen-doped Reduced Graphene Oxide- an Analysis of the Role of Electrolyte pH and Concentration**

S. THAREJA, A. KUMAR, Department of Chemistry, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, India

SYMPOSIUM FJ

ADVANCED PHOTOCATALYTIC MATERIALS FOR ENERGY AND CHEMISTRY IN TRANSITION AND FOR ENVIRONMENTAL APPLICATIONS

Session FJ-1

Design elements and advanced concepts for photofunctional materials

FJ-1:IL01 Merging catalysis with photocatalysis - a new generation of photocatalytic materials

W. MACYK, T. TABARI, J. KUNCEWICZ, M. KOBIELUSZ, Z. SOJKA, Faculty of Chemistry, Jagiellonian University, Kraków, Poland

FJ-1:IL02 Ultrafast Charge Carriers Dynamics vs. Photoelectrochemical Performance of WO₃/BiVO₄ Heterojunction Photoanodes

I. GRIGIONI, M.V. DOZZI, **E. SELLI**, Dipartimento di Chimica, Università degli Studi di Milano, Milano, Italy

FJ-1:IL03 Phenomena Affecting the Carbon Dioxide Reduction Activity of Semiconductor Photoelectrodes

M.T. MAYER, Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin, Germany

FJ-1:IL04 EPR Analysis as a Tool for the Characterization of Photofunctional Materials

S. LIVRAGHI, Dipartimento di Chimica and NIS, Università di Torino, Torino, Italy

FJ-1:IL05 Molecular-catalyst/Semiconductor Hybrid Systems for Solar-driven CO₂ Reduction

TAKESHI MORIKAWA, Toyota Central R&D Labs., Inc., Aichi, Japan

FJ-1:IL06 Coupling Solar Energy into Catalytic CO₂ Conversion

YUJIE XIONG, School of Chemistry and Materials Science, University of Science and Technology of China, Hefei, Anhui, China

FJ-1:IL07 Surface Plasmon-driven Inactivation of Microorganisms and Decomposition of Organic Compounds

E. KOWALSKA, Institute for Catalysis, Hokkaido University, Sapporo, Japan

FJ-1:IL08 Optical and Catalytic Modification of Ceria for Photothermal REDUCTION OF CO₂

D.B. O'NEILL, Y. BU, A. HUIJSER, **G. MUL**, PhotoCatalytic Synthesis group, MESA+ Institute of Nanotechnology, University of Twente, AE Enschede, The Netherlands

FJ-1:IL09 Visible-light-driven Photocatalyst of Conjugated Polymer Dots on Mesoporous Titania

SEONYOUNG JO, **TAEK SEUNG LEE**, Organic and Optoelectronic Materials Laboratory, Department of Advanced Organic Materials and Textile System Engineering, Chungnam National University, Daejeon, South Korea

FJ-1:IL10 A "Pure" Titania Photocatalyst: Preparation, Characterization and Photocatalytic Activity of Octahedral-shaped Anatase Particles

BUNSHO OHTANI^{1,2}, Y. LI², M. TAKASHIMA^{1,2}, **E. KOWALSKA**^{1,2}, ¹Institute for Catalysis, Hokkaido University, Sapporo, Japan; ²Graduate School of Environmental Science, Hokkaido University, Sapporo, Japan

FJ-1:IL11 Electronic Structures and Energy Applications of Layered Materials

HONG SEOK KANG, Jeonju University, Department of Nano & Advanced Materials, Chonbuk, South Korea

Session FJ-2

Photoinduced processes and charge transport

FJ-2:IL01 A Holistic Approach to Model the Kinetics of Photocatalytic Reactions

J.Z. BLOH, DECHEMA-Forschungsinstitut, Frankfurt, Germany

FJ-2:IL02 The Photocatalyst Heterostructure System from Earth-abundant Elements and Z-scheme Charge Transfer Mechanism

A. ŠUTKA, M. VANAGS, Research Laboratory of Functional Materials Technologies, Faculty of Materials Science and Applied Chemistry, Riga Technical University, Riga, Latvia

FJ-2:IL03 TiO₂ Anatase Nanoparticles with Controlled Shape and Size: a Step Forward in the Elucidation of Surface and Electronic Key Features for Photocatalytic Performances

G. MARTRA, L. MINO, F. PELLEGRINO, M. CHIESA, V. MAURINO, Department of Chemistry and NIS Interdepartmental Centre, University of Torino, Torino, Italy

FJ-2:IL04 Semiconductor Induced Nitrate Radicals Formation and Applications for Selective Photocatalytic Syntheses

F. PARRINO, S. DIRÈ, R. CECCATO, Department of Industrial Engineering, University of Trento, Trento, Italy; L. PALMISANO, Department of Engineering, University of Palermo, Palermo, Italy; S. LIVRAGHI, E. GIAMELLO, Dipartimento di Chimica and NIS, University of Torino, Torino, Italy

FJ-2:IL05 Theoretical Design of Low-Dimensional Metal-free Photocatalyst toward Overall Water Splitting under Visible Light

XIAOJUN WU, University of Science and Technology of China, Hefei, Anhui, China

FJ-2:IL06 Modelling of Photoelectrodes for Solar Water Splitting

P. CENDULA, University of Zilina, Lipt.Mikulas, Slovakia

FJ-2:IL07 Time-resolved Spectroscopic Studies of Hybrid Nanostructures for Light-driven Water-splitting

M. WÄCHTLER, Leibniz Institut of Photonic Technology, Department Functional Interfaces, Jena, Germany; & Friedrich Schiller University Jena, Institute of Physical Chemistry and Abbe Center of Photonics, Jena, Germany

FJ-2:IL08 Multiredox Catalysis on Metal Oxides for Solar Water Splitting

C.A. MESA, Imperial College London, London, UK

FJ-2:IL09 Mechanistic Studies of Water Splitting Materials: Relation of Bulk and Surface Processes in Oxide Photoabsorbers

J.P. HOFMANN, Department of Chemical Engineering and Chemistry, Eindhoven University of Technology, Eindhoven, The Netherlands

FJ-2:IL10 Time-resolved Photoluminescence Spectroscopy for the Characterization of Noble Metal Nanoparticle- Modified N,F-doped TiO₂

M.V. DOZZI, Dipartimento di Chimica, Università degli Studi di Milano, Milano, Italy

FJ-2:L11 In-situ Study of Interplay Between Defect and Phase Evolution in High Temperature Thermochemical Water Splitting Oxides

R. BELL¹, S. SHULDA¹, D. PLATTENBERGER¹, N. STRANGE¹, P. PARILLA¹, A. AMBROSINI², A. MCDANIEL², **D. GINLEY**¹, ¹National Renewable Energy Laboratory, Golden, CO, USA; ²Sandia National Laboratory, USA

FJ-2:L12 Solar Energy Induced Water Splitting for Hydrogen Generation- Our Experience with Metal Oxides

S. DASS, Department of Chemistry, Faculty of Science, Dayalbagh Educational Institute, Dayalbagh Dayalbagh, Agra, India

Session FJ-3

Design approaches for advanced applications

FJ-3:L01 Investigation on the Difference between Microwave Irradiation and Conventional Heating for Metal Nanoparticle Synthesis in Liquid

TAKU NAGATA¹, Y. XIN², R. IWAZAKI¹, T. SHIRAI^{1,2}, ¹Department of Life Science and Applied Chemistry, Graduate School of Engineering, Nagoya Institute of Technology, Gokiso-cho, Showa-ku Nagoya, Aichi, Japan; ²Advanced Ceramics Research Center, Nagoya Institute of Technology, Gokiso-cho, Showa-ku Nagoya, Aichi, Japan

FJ-3:L02 Photocatalytic Degradation of Small Microplastics Present in Continental Waters of the Northeast of Mexico Using TiO₂-based Semiconductors

H.A. CARREÓN-LÓPEZ¹, E. VALDÉS-CERDA¹, J.M. ALFARO-BARBOSA¹, C. SILIGARDI², E.I. CEDILLO-GONZÁLEZ¹, ¹Universidad Autónoma de Nuevo León, Facultad de Ciencias Químicas, Laboratorio de Materiales III, Monterrey, N.L., México; ²Università degli Studi di Modena e Reggio Emilia, Dipartimento di Ingegneria Enzo Ferrari, Modena, Italy

FJ-3:L03 Graphene as a 2D Support Shuttle for Separating Photo-generated Charges: an Example combining Copper and TiO₂ Nanotubes

E. ZGHAB, M. HAMANDI, F. DAPPOZZE, C. GUILLARD, **G. BERHAULT**, IRCELYON, Villeurbanne, France; E. ZGHAB, M. SAÏD ZINA, Univ. Tunis El Manar, Laboratoire de Chimie des Matériaux et Catalyse, Tunis, Tunisia; H. KOCHKAR, Basic & Applied Scientific Research Center, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia

FJ-3:L04 Fighting Microplastic Marine Litter: The Role of the Hydroxyl Radical in the Photocatalytic Degradation of HDPE Microplastics Using a TiO₂-based Semiconductor

A.D. VITAL-GRAPPIN¹, J.M. HERNÁNDEZ-LÓPEZ¹, C. SILIGARDI², E.I. CEDILLO-GONZÁLEZ¹, ¹Universidad Autónoma de Nuevo León, Facultad de Ciencias Químicas, Departamento de Ingeniería Química e Ingeniería Ambiental, San Nicolás de los Garza, N.L., México; ²Università degli Studi di Modena e Reggio Emilia, Dipartimento di Ingegneria "Enzo Ferrari", Modena, Italy

FJ-3:L05 Photocatalysis for Microplastic Pollution Remediation: the Influence of Temperature, pH and N-TiO₂ Load in the Aqueous Photocatalytic Degradation of HDPE Microbeads

V.M. LUNA-HERNÁNDEZ¹, J.M. HERNÁNDEZ-LÓPEZ¹, C. SILIGARDI², E.I. CEDILLO-GONZÁLEZ¹, ¹Universidad Autónoma de Nuevo León, Facultad de Ciencias Químicas, Laboratorio de Materiales III, Monterrey, N.L., México; ²Università degli Studi di Modena e Reggio Emilia, Dipartimento di Ingegneria "Enzo Ferrari", Modena, Italy

FJ-3:L06 Power Law Kinetics of Self-cleaning Photocatalytic Surfaces: Decision Tree for Prediction of Reaction Kinetic Order

D.F. OLLIS, Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC, USA

FJ-3:L07 Development of TiO₂-based Photocatalysts Using Pteris Sterna and Pinctada Mazatlanica Oysters

D.A. CRUZ-BERNAL¹, B.E. LLORENTE-GARCÍA¹, A.M. HUERTA-FLORES¹, P.E. SAUCEDO-LASTRA², C. SILIGARDI³, E.I. CEDILLO-GONZÁLEZ¹, ¹Universidad Autónoma de Nuevo León, Facultad de Ciencias Químicas, Laboratorio de Materiales III, Monterrey, N.L., México; ²Instituto Politécnico Nacional s/n, La Paz, B.C.S.; ³Università degli Studi di Modena e Reggio Emilia, Dipartimento di Ingegneria Enzo Ferrari, Modena, Italy

FJ-3:L08 Highly Selective Plasmonic CO₂ to CH₄ Photoreduction with Water over Au/TiO₂

S. BARDEY, C. PAGIS, A. BONDUELLE-SKRZYPCZAK, A. FÉCANT, IFP Energies Nouvelles (IFPEN), Solaize, France; V. CAPS, **V. KELLER**, Institut de Chimie et des Procédés pour l'Energie, l'Environnement et la Santé (ICPEES), UMR CNRS 7515, University of Strasbourg, Strasbourg, France

FJ-3:L09 Photocatalytic Degradation of Polystyrene Nanoplastics Using a Visible-active N-TiO₂ Semiconductor

C.A. ROJAS-GUERRERO¹, J.M. HERNÁNDEZ-LÓPEZ¹, C. SILIGARDI³, E.I. CEDILLO-GONZÁLEZ¹, ¹Universidad Autónoma de Nuevo León, Laboratorio de Materiales III, Mexico; ²Università degli Studi di Modena e Reggio Emilia, Dipartimento di Ingegneria Enzo Ferrari, Modena, Italy

FJ-3:L10 Immobilization of Cu²⁺ ↔ Cu⁺ Pairs on Siloxane-polyether Hybrid: A New Solid-liquid Reactor for Azo-dyes Degradation by Fenton Reactions.

G. PALÁCIO, C.T. PIZA, S.H. PULCINELLI, C.V. SANTILLI, Chemistry Institute of the São Paulo State University - UNESP, Araraquara, São Paulo, Brazil

FJ-3:IL11 2D Conjugated Polymers for Photocatalytic Overall Water Splitting

HANGXUN XU, University of Science and Technology of China, Hefei, Anhui, China

FJ-3:IL12 Artificial Photosynthesis of C₁-C₆ Using Copper and Iron Mixed Oxide Films

HYUNWOONG PARK, School of Energy Engineering, Kyungpook National University, Daegu, South Korea

FJ-3:L13 Photocatalytic Degradation of Primary and Secondary Polystyrene Microplastics Using a Carbon and Nitrogen Co-doped TiO₂ Photocatalyst

J. GARCÍA-MONTEMAYOR¹, J.M. HERNÁNDEZ-LÓPEZ¹, C. SILIGARDI², E.I. CEDILLO-GONZÁLEZ¹, ¹Universidad Autónoma de Nuevo León, Monterrey, México; ²Università degli Studi di Modena e Reggio Emilia, Modena, Italia

FJ-3:L14 Tiny Pollutant Plastics of 5 mm or Less: How the Microplastic's Particle Size Influences their Photocatalytic Degradation by TiO₂ Films

D.I. PEÑA-DUARTE¹, J.M. HERNÁNDEZ-LÓPEZ¹, C. SILIGARDI², E.I. CEDILLO-GONZÁLEZ¹, ¹Universidad Autónoma de Nuevo León, Monterrey, México; ²Università degli Studi di Modena e Reggio Emilia, Modena, Italy

SYMPOSIUM FK

STIMULI RESPONSIVE AND MULTIFUNCTIONAL POLYMERS: PROGRESS IN MATERIALS AND APPLICATIONS

Session FK-1

Shape-memory polymers and actuators

FK-1:IL01 Shape-memory Polymer Actuators for Robotics

A. LENDLEIN, Institute of Biomaterial Science, Helmholtz-Zentrum Geesthacht, Teltow, Germany, & University of Potsdam, Potsdam, Germany

FK-1:IL02 New Generation of Self-healable Commodity Polymers

S. WANG, D. DAVYDOVICH, **M.W. URBAN**, Department of Materials Science and Engineering, Clemson University, Clemson, SC, USA

FK-1:IL03 Thermadapt Shape Memory Polymer

TAO XIE, College of Chemical and Biological Engineering, Zhejiang University, Hangzhou, Zhejiang, China

FK-1:IL04 Shape Memory Polymer Foam Hemostats for Traumatic Wounds

M.B.B. MONROE¹, H.T. BEAMAN¹, G. NEIMAN², J. SATALIN², S. BAKER², A.U. VAKIL¹, C. DU¹, J. LIU¹, N.M. PETRYK¹, ¹Syracuse University, Syracuse, NY, USA; ²SUNY Upstate Medical University, USA

FK-1:L05 Effect of Build Orientation, Print Parameters, and Thermo-mechanical History on Performance of 3D-Printed Biomedical Shape-Memory Thermoplastic Polyurethane

D.L. SAFRANSKI, MedShape Inc., Atlanta, GA, USA; J.S. CONSOLI, Georgia Institute of Technology, Atlanta, GA, USA

Session FK-2

Degradable, stimuli-sensitive polymers

FK-2:IL01 Stimuli-responsive Polymer-based Sensors, Muscles, and Drug Delivery Platforms

M.J. SERPE, Department of Chemistry, University of Alberta, Edmonton, Canada

FK-2:IL02 pH-sensitive Polymers and Polymer Nanocomposites for Drug Delivery

BIQIONG CHEN, Queen's University Belfast, Belfast, UK

FK-2:IL03 Biodegradable Injectable Polymer Systems Exhibiting Temperature-responsive Irreversible Gelation

YUICHI OHYA, Faculty of Chemistry, Materials and Bioengineering, Kansai University, Suita, Japan

Session FK-3

Stimuli-sensitive gels

FK-3:IL01 Dually Cross-linked Stimuli-sensitive Gels

J. LI¹, J. PARADIES¹, M. YIN², **D. KUCKLING¹**, ¹Department of Chemistry, Paderborn University, Paderborn, Germany; ²State Key Laboratory of Chemical Resource Engineering, Beijing Laboratory of Biomedical Materials, Beijing University of Chemical Technology, Beijing, China

FK-3:IL02 How Can "Smart" Organometallic Hydrogels Learn and Forget

M.A. HEMPENIUS, K. ZHANG, X. FENG, S. SUI, **G.J. VANCISO**, University of Twente, Enschede, The Netherlands

FK-3:IL03 Multifunctional Interpenetrated Polymer Networks

K. ROHTLAID¹, F. BRAZ RIBEIRO¹, T. M.G. NGUYEN¹, C. SOYER², J.D.W. MADDEN³, E. CATTAN², F. VIDAL¹, **C. PLESSE¹**, ¹Laboratoire de Physicochimie des Polymères et des Interfaces (LPPi) - EA2528, Université de Cergy-Pontoise, Cergy-Pontoise, France; ²Univ. Polytechnique des Hauts de France, CNRS, Univ. Lille, Yncrea, Centrale Lille, UMR 8520 - IEMN, DOAE, Valenciennes, France; ³Department of Electrical & Computer Engineering, Advanced Materials & Process Engineering Laboratory, University of British Columbia, Vancouver, Canada

FK-3:L04 Tubular Gel Micro-Origami: Self-Folding Hydrogel Patterns for Vascular Scaffolds

A. MAIER, M.C. PANTIN-ARMAS, R.S. KALVADE, J.H. VAN ESCH, E. MENDES, Delft University of Technology, Delft, The Netherlands

FK-3:L05 Dual-responsive PF127 Hydrogel Based Drug Delivery System of Traditional Chinese Medicine for the Treatment of Atopic Dermatitis

CHI LEUNG HUI, S. CHATTERJEE, Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Kowloon, Hong Kong

Session FK-4**Multifunctional (nano)composites and multi-material systems****FK-4:IL01 Carbon-based Polymer Nanocomposite Foams for Electromagnetic Interference Shielding**

H. ABBASI, M. ANTUNES, D. ARENCÓN, J.I. VELASCO, Universitat Politècnica de Catalunya- UPC BARCELONATECH, Terrassa (Barcelona), Spain

FK-4:IL02 Ionic Liquid-Polyurethane/Conductive Polymer Composites for Soft Actuators and Sensors

HIDENORI OKUZAKI, University of Yamanashi, Kofu, Japan

FK-4:IL03 Lignin as a Valuable Tool for Functional Coatings, Composites and Beyond

G. GRIFFINI, Department of Chemistry, Materials and Chemical Engineering "Giulio Natta", Politecnico di Milano, Milano, Italy

FK-4:L04 Scratch-resistant and durable Anti-fouling Surfaces for Underwater Equipment

T. WEYRICH, M. ES-SOUNI, Institute for Materials and Surface Technology, Kiel University of Applied Sciences, Schleswig-Holstein, Germany

FK-4:L05 Corrosion Resistant Polymer-based Nanocomposite Coatings with High Level of Microwaves Absorption

T. PRIKHNA¹, O. PRYSIAZHNA¹, V. MOSHCHIL¹, M. MONASTYROV^{1,2}, L. ANASTASIYA¹, ¹V. Bakul Institute for Superhard Materials of the National Academy of sciences of Ukraine, Kyiv, Ukraine; ²Open International University of Human Development «Ukraine», Kyiv, Ukraine

FK-4:L06 Nanomechanical Characterization and Finite Element Analysis of Polymer-coated Porous Anodic Aluminum Oxide Thin Films Using Nanoindentation and Scratch Testing Technology

H. BAKHTI, M. ES-SOUNI, Institute for Materials and Surface Technology, University of Applied Sciences Kiel, Kiel, Germany

FK-4:L07 Structure and Thermal Stability of PMMA/Fe-Laponite Nanocomposites: In Situ XAS/Raman Study

C.R. FERREIRA¹, C.V. SANTILLI¹, S.H. PULCINELLI¹, V. BRIOIS², ¹Unesp, Institute of Chemistry, Campus de Araraquara, Brazil; ²SOLEIL Synchrotron, Gif-sur-Yvette, France

Session FK-5**Multifunctional surfaces****FK-5:IL01 Polydopamine Coating and Gallol Interface Chemistry**

HAESHIN LEE, Department of Chemistry, KAIST, Daejeon, South Korea

FK-5:IL02 Molecular and Bulk Mechanics of Catecholamine Coatings

P. DELPARASTAN, K. MALOLLARI, P.B. MESSERSMITH, Departments of Materials Science and Engineering, Mechanical Engineering and Bioengineering, University of California, Berkeley, CA, USA; Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA, USA

Session FK-6**Multifunctional polymer systems for energy storage and flexible electronics****FK-6:IL01 Electrostrictive Polymers for Sensing and Energy Harvesting Applications**

P. POULIN, CNRS University of Bordeaux, Pessac, France

FK-6:IL02 A New Class of Submolecular Switches Based on the DBCOD Conformational Change

W. FU¹, T. ALAM², R. ADAMS³, J.C. LI⁴, W. YANG⁴, JENNIFER LU¹, ¹Materials Science and Engineering, University of California at Merced, Merced, CA, USA; ²Sandia National Laboratory, USA; ³Chemistry Department, University of Manchester, UK; ⁴Chemistry Department, Duke University, USA

FK-6:IL03 Electrodes by Selective Laser Sintering

M. HAUUKA, University of Jyväskylä, Department of Chemistry, Jyväskylä, Finland

FK-6:IL04 Advanced Organic-inorganic-hybrid Perovskite Transistors for Emerging Applications

T.D. ANTHOPOULOS, King Abdullah University of Science and Technology (KAUST), KAUST Solar Centre, Thuwal, Saudi Arabia

FK-6:L05 Polymerized Liquid Metal Networks

C. TABOR, C. THRASHER, Air Force Research Laboratory, Wright Patterson, OH, USA

FK-6:L06 Redox Active Poly(Ionic Liquid) for Hybrid Flexible Electrochemical Energy Storage Device

T.-N. PHAM TRUONG, J. GHILANE, H. RANDRIAMHAZAKA, Université de Paris, ITODYS, CNRS UMR 7086 SIELE group (Surfaces - Ionic liquids - Electrochemistry - Energy), Paris Cedex, France

Session FK-7**Medical applications of smart polymers****FK-7:IL01 Biomaterials for Regenerative Engineering: Enabling Regenerative Medicine**

G. AMEER, Northwestern University, Evanston, IL, USA

FK-7:IL02 Oxidation-sensitive Polymers as Anti-inflammatory Agents

N. TIRELLI, Laboratory of Polymers and Biomaterials, Fondazione Istituto Italiano di Tecnologia (IIT), Genova, Italy

FK-7:IL03 Developing Advanced Computational Tools to Enable the Study and Application of Cell Mechanobiology

J.H. HENDERSON, Syracuse Biomaterials Institute/BioInspired Syracuse: Institute for Material and Living Systems/Syracuse University, Syracuse, NY, USA

FK-7:IL04 Bio-inspired Complex Coacervate-based Adhesives

M. KAMPERMAN, Zernike Institute for Advanced Materials, University of Groningen, Groningen, The Netherlands

Session FK-8**Additive manufacturing for multifunctional materials****FK-8:IL01 3D/4D Printing of Liquid Crystal Elastomers**

C.P. AMBULO, X. LU, T.H. WARE, The University of Texas at Dallas, Richardson, TX, USA

FK-8:IL02 Photo-Crosslinkable, 3D-Printable (Bio)Polymer Platform to Serve Tissue Engineering Needs

J. VAN HOORICK^{1,2}, L. TYTGAT^{1,2}, L. VAN DAMME^{1,3}, A. ARSLAN¹, P. GRUBER^{4,5}, M. MARKOVIC^{4,5}, A. OVSIANIKOV^{4,5}, H. DECLERCQ⁶, P. DUBRUEL¹, S. VAN VLIERBERGHE^{1,2}, ¹Polymer Chemistry & Biomaterials Group, Centre of Macromolecular Chemistry, Ghent University, Ghent, Belgium; ²Brussels Photonics, Department of Applied Physics and Photonics, Vrije Universiteit Brussel, Brussels, Belgium; ³Plastic and Reconstructive Surgery, Department of Surgery, University Hospital Ghent, Ghent, Belgium; ⁴Institute of Materials Science and Technology, Vienna University of Technology (TU Wien), Austria; ⁵Austrian Cluster for Tissue Regeneration (www.tissue-regeneration.at); ⁶Tissue engineering and Biomaterials Group, Department of Basic Medical Sciences, University Hospital Ghent, Ghent, Belgium

FK-8:IL03 3D Light-assisted Manufacturing of Polymer and Hydrogel Architectures for Life Science and Biology

A. ACCARDO, Department of Precision and Microsystems Engineering, Delft University of Technology, Delft, The Netherlands

FK-8:L04 Temperature-memory Effect and Tunable Shape Recovery of 3D Printed Auxetic Structures

S. PANDINI, D. BATTINI, N. INVERARDI, F. BIGNOTTI, Department of Mechanical and Industrial Engineering, University of Brescia, Brescia, Italy; G. SCALET, S. MARCONI, F. AURICCHIO, Department of Civil Engineering and Architecture, University of Pavia, Pavia, Italy

Session FK-9**Multifunctional materials for soft robotics****FK-9:IL01 Bioinspired Smart Materials: Sensing, Solar Harvesting, and Soft Robotics**

XIMIN HE, University of California at Los Angeles, Los Angeles, CA, USA

FK-9:IL02 Plants as Concept Generators for the Development of New Materials Systems for Soft-robotics

T. SPECK^{1,2,3}, M. THIELEN^{1,2}, F. ESSER^{1,2,3}, B. MAZZOLAI⁴, ¹Botany: Functional Morphology & Biomimetics, Botanic Garden of the University of Freiburg, Freiburg, Germany; ²Freiburg Materials Research Centre (FMF) and Freiburg Institute for Interactive Materials & Bioinspired Technologies (FIT), Germany; ³Cluster of Excellence Living, Adaptive and Energy-autonomous Materials Systems (livMatS @ FIT); ⁴Italian Institute of Technology (IIT), Italy

FK-9:IL03 Electroactive Polymer (EAP) Gel Actuators

KINJI ASAKA, National Institute of Advanced Industrial Science and Technology (AIST), Ikeda, Osaka, Japan

FK-9:IL04 HASEL Artificial Muscles

C. KEPLINGER, Department of Mechanical Engineering, University of Colorado Boulder, Boulder, CO, USA

FK-9:IL05 Multi-functional Flexible Sensors for Soft Robotics

KUNIHARU TAKEI, Osaka Prefecture University & JST PRESTO, Sakai, Osaka, Japan

FK-9:IL06 Hydrogel Scaffolds for Biohybrid Soft Robotics

C. ARNDT, C. SELHUBER-UNKEL, Kiel University, Kiel, SH, Germany; C. APPIAH, A. STAUBITZ, University of Bremen, Bremen, HB, Germany

SYMPOSIUM FL

STATE-OF-THE-ART RESEARCH AND APPLICATIONS OF SHAPE MEMORY ALLOYS

Session FL-1

SMA materials and materials design

FL-1:IL01 High Temperature Shape Memory Alloys - Current Status and Future

I. KARAMAN, T.V. UMALE, A.R. DEMBLON, W. TREHERN, B. YOUNG, Department of Materials Science and Engineering, Texas A&M University, College Station, TX, USA

FL-1:IL02 A first-principles Perspective on the Interplay of Magnetism and Microstructure in Ni-Mn-based Heusler Alloys

M.E. GRUNER, Faculty of Physics and Center for Nanointegration, CENIDE, University of Duisburg-Essen, Duisburg, Germany

FL-1:IL03 Strain Glass and Novel Properties

XIAOBING REN, Frontier Institute of Science and Technology, Xi'an Jiaotong University, Center for Functional Materials, National Institute for Materials Science, Tsukuba, Japan

FL-1:IL04 Systematic Transition Metals Doping of Ni-Mn-Ga and Comparison of Single Crystals Grown by Different Technique

O. HECZKO, V. KOPECKÝ, D. MUSIENKO, F. NILSEN, M. RAMEŠ, P. VERTÁT, Š. SUKUP, S. HECZKO, L. STRAKA, FZU - Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic; R. COLMAN, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic

FL-1:IL05 Optimizing Novel Manufacturing Processes for Ni-Mn-Ga Magnetic Shape Memory Materials

E. PAGOUNIS, ETO MAGNETIC GmbH, Stockach, Germany

FL-1:IL06 NiMn Based Heusler Alloys for Magnetocaloric Applications: Direct and Inverse Magnetocaloric Effects, Large Scale Synthesis.

S. FABBRICI, C. BENNATI, F. ALBERTINI, IMEM-CNR, Parma, Italy; F. PUGLIELLI, V. MUSSI, MUSP Laboratory, Piacenza, Italy; F. CUGINI, N. SARZI AMADÉ, M. SOLZI, Department of Mathematical, Physical and Computer Sciences, University of Parma, Parma, Italy

FL-1:IL07 Size Effects in Ferromagnetic Shape Memory Alloys: Foams, Microwires and particles

XUEXI ZHANG, M. QIAN, School of Materials Science and Engineering, Harbin Institute of Technology, Harbin, China

FL-1:IL08 Study of Interfacial Adhesion between Nickel-titanium Shape Memory Alloy and a Polymer Matrix by Laser Surface Pattern

S. SAMAL, P. SITTNER, M. MALIK, P. PODDAR, Department of Functional Materials, Institute of Physics of Czech Academy of Science, Prague, Czech Republic; National Chemical Laboratory, Pune, India

Session FL-2

Basic phenomena and theory

FL-2:IL01 Ultrasonic Characterization of Shape Memory Alloys: From Elastic Constants to High-frequency Twin Motion

H. SEINER, P. SEDLAK, L. BODNAROVA, Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic

FL-2:IL02 The Impact of the Interaction between Twin Microstructures and Magnetic Domain Patterns on the Magneto-mechanics of Magnetic Shape Memory Alloys

P. MÜLLNER, M. VELIGATLA, Boise State University, Boise, ID, USA; A. HOBZA, SpaceX, Long Beach, CA, USA; C.J. GARCÍA-CERVERA, University of California Santa Barbara, Santa Barbara, CA, USA & Basque Center for Applied Mathematics, Bilbao, Spain

FL-2:IL03 Mem-models for Simulation and Identification of Non-symmetric Hysteresis in Material Systems and Devices

JIN-SONG PEI, University of Oklahoma, Norman, OK, USA; B. CARBONI, W. LACARBONARA, Sapienza University of Rome, Rome, Italy; S. MASRI, University of Southern California, USA

FL-2:IL04 TEM Studies on Magnetic and Crystallographic Microstructures Associated with Martensitic Phase Transformations

YASUKAZU MURAKAMI, Department of Applied Quantum Physics and Nuclear Engineering, Kyushu University, Fukuoka, Japan

FL-2:IL05 Symmetry Analysis of Martensitic Transition in Magneto-caloric Heusler Alloys

F. ORLANDI¹, A. CAKIR², R. WAITE^{1,3}, P. MANUEL¹⁰, D.D. KHALYAVIN¹, M. ACET⁴, L. RIGHI^{5,6}, ¹ISIS Facility, Rutherford Appleton Laboratory - STFC, Chilton, Didcot, UK; ²Mugla Stiki Kocman University, Department of Metallurgical and Materials Engineering, Mugla, Turkey; ³H.H. Wills Physics Laboratory, University of Bristol, Bristol, UK; ⁴Faculty of Physics and Center for Nanointegration (CENIDE), Universität Duisburg-Essen, Duisburg, Germany; ⁵Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Parma, Italy; ⁶IMEM-CNR, Parma, Italy

FL-2:IL06 Relationship of the Lattice Parameter with the Degree of Ordering in Fe-Ga Alloys: Experimental and Ab Initio Studies

V.D. BUCHELNIKOV^{1,3}, M.V. MATYUNINA¹, M.A. ZAGREBIN¹, A.M. BALAGUROV², I.S. GOLOVIN³, V.V. SOKOLOVSKIY^{1,3}, ¹Chelyabinsk State University, Chelyabinsk, Russia; ²Joint Institute for Nuclear Research, Dubna, Russia; ³National University of Science and Technology "MISIS", Moscow, Russia

FL-2:IL07 Effect of Doping on Magnetocrystalline Anisotropy of Ni-Mn-Ga Magnetic Shape Memory Alloy: An Ab Initio Study

M. ZELENÝ, Brno University of Technology, Faculty of Mechanical Engineering, Brno, Czech Republic; Charles University, Faculty of Mathematics and Physics, Prague, Czech Republic; L. STRAKA, M. RAMEŠ, O. HECZKO, Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic

FL-2:IL08 Coupled Transformation and Plasticity in NiTi Shape Memory Alloy

P. SEDLÁK, B. BENEŠOVÁ, M. FROST, H. SEINER, Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic; L. HELLER, P. ŠITTNER, Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic

FL-2:IL09 Anhyseteric Post-critical Behavior in Magnetic Shape Memory Alloys: Recent Progress

V.A. CHERNENKO, BC Materials & University of Basque Country & Ikerbasque, Basque Foundation for Science, Bilbao and IIR, Tokyo Institute of Technology, Tokyo, Japan; K. ZOUBKOVA, H. SEINER, Institute of Thermomechanics, Prague, Czech Republic; E. VILLA, CNR ICMATE Sede di Lecco, Lecco, Italy; M. TAHARA, M. CHANG, M. SONE, H. HOSODA, Institute of Innovative Research (IIR), Tokyo Institute of Technology, Japan

FL-2:IL10 Segregation Tendencies in Heusler Alloys from First Principles

V.V. SOKOLOVSKIY¹, M.E. GRUNER², P. ENTEL², M. ACET², V.D. BUCHELNIKOV¹, ¹Faculty of Physics, Chelyabinsk State University, Chelyabinsk, Russia; ²Faculty of Physics and Center for Nanointegration, CENIDE, University of Duisburg-Essen, Duisburg, Germany

Session FL-3

Functional properties

FL-3:IL01 Mechanocaloric effects in all 3d Magnetic Shape Memory Alloys

L. MANOSA, A. GRÀCIA, A. PLANES, Universitat de Barcelona, Barcelona, Catalonia, Spain; W. XIONG, D. CONG, University of Science and Technology Beijing, China

FL-3:IL02 Multicaloric Heusler Compounds: Review and Prospects
O. GUTFLEISCH, K. SKOKOV, A. TAUBEL, L. PFEUFFER, F. SCHEIBEL, TU Darmstadt, Materials Science, Functional Materials, Darmstadt, Germany; T. GOTTSCHALL, Helmholtzzentrum Dresden Rossendorf, HZDR, Germany

FL-3:IL03 Magnetocaloric Properties of Polycrystalline Samples of NiMnGaCu Ferromagnetic Shape Memory Alloy: Effect of Improvement of Thermoelastic Martensitic Transformation
E. VILLA¹, C. TOMASI², A. NESPOLI¹, F. PASSARETTI¹, G. LAMURA³, F. CANEPA⁴, ¹CNR-ICMATE Sede di Lecco, Lecco, Italy; ²CNR-ICMATE Sede di Genova, Genova, Italy; ³CNR-SPIN, Genova, Italy; ⁴Dipartimento di Chimica e Chimica Industriale, Università di Genova, Genova, Italy

FL-3:IL04 TiNi Alloy Functional Properties during Thermal Cycling in the Temperature Range of Incomplete Martensitic Transformations
 S.P. BELYAEV, N.N. RESNINA, **A.V. SIBIREV**, Saint-Petersburg State University, Saint-Petersburg, Russia

FL-3:IL05 Reentrant Martensitic Transformation in Co-based Heusler Alloys
XIAO XU, R. KAINUMA, Tohoku University, Sendai, Japan; T. KANOMATA, Tohoku Gakuin University, Tagajo, Japan

Session FL-4

Thin films and micro/nano-systems

FL-4:IL01 Shell Ferromagnetism
M. ACET¹, A. CAKIR², M. FARLE¹, ¹Physics Faculty, Duisburg-Essen University, Duisburg, Germany; ²Department of Metallurgical and Materials Engineering, Muğla Sıtkı Koçman University, Muğla, Turkey

FL-4:IL02 Microstructure Engineering of Magnetic Shape Memory Thin Films and Nanostructures
F. CASOLI, M. TAKHSHA GHAFAROKHI, L. NASI, S. FABBRICI, R. CABASSI, G. TREVISI, F. ALBERTINI, IMEM - CNR, Parma, Italy; J.A. ARREGI, M. STANO, M. HORKY, J. HAJDUCEK, V. UHLIR, CEITEC BUT, Brno, Czech Republic; A. CHIRKOVA, F. MACCARI, Functional Materials, TU Darmstadt, Darmstadt, Germany

FL-4:IL03 Instability of Lattice Modulation in Ni-Mn-Ga Thin Films
YANLING GE¹, L. STRAKA², S.-P. HANNULA¹, O. HECZKO², ¹Aalto University, Espoo, Finland; ²Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic

FL-4:IL04 Epitaxial NiTi Thin Films: Growth, Microstructure and Martensitic Phase Transition in Comparison with NiMnGa
K. LÜNSER^{1,2}, S. SCHWABE^{1,2}, M. DÖLLGAST^{1,2}, K. NIELSCH^{1,2}, S. FÄHLER¹, ¹Leibniz IFW Dresden, Institute for Metallic Materials, Dresden, Germany; ²Institute of Materials Science, TU Dresden, Dresden, Germany

Session FL-5

SMAs applications

FL-5:IL01 Smart Structures with Embedded NiTi Actuators for Aerospace Applications
P. BETTINI, D. RIGAMONTI, Department of Aerospace Science and Technology, Politecnico di Milano, Milan, Italy

FL-5:IL02 An Experimental Study on the Evolution of Damping Properties of NiTi and NiTiCu Shape Memory Alloys with the Modulation of the Microstructure
F. VILLA, E. VILLA, A. NESPOLI, F. PASSARETTI, Consiglio Nazionale delle Ricerche - Istituto della Materia Condensata e di Tecnologie per l'Energia (CNR-ICMATE Sede di Lecco), Lecco, Italy

FL-5:IL03 Improvements of Mechanical Properties of Plaster by Restoring Force of Reinforced Fiber
YOSHIMI WATANABE, D. SHIMOBAYASHI, H. SATO, Nagoya Institute of Technology, Nagoya, Aichi, Japan

FL-5:IL04 Biomedical Applications of Shape Memory Alloys
YUFENG ZHENG, Department of Materials Science and Engineering College of Engineering, Peking University, Beijing, China

FL-5:IL05 Thermomagnetic Thin Film Energy Harvester
J. JOSEPH, L. SEIGNER, M. KOHL, Karlsruhe Institute of Technology (KIT), Institute of Microstructure Technology (IMT), Karlsruhe, Germany

FL-5:IL06 NiTi Surfaces for Minimally Invasive Medical Devices
A. UNDISZ, Friedrich-Schiller-Universität, Jena, Germany

FL-5:IL07 Thermomagnetic Materials for Harvesting Low Temperature Waste Heat
D. DZEKAN¹, A. WASKE², K. NIELSCH¹, S. FÄHLER³, ¹Leibniz IFW Dresden, Institute for Metallic Materials, Dresden, Institute for Material Science, Dresden, Germany; ²BAM, Berlin, Germany; ³Leibniz IFW Dresden, Institute for Metallic Materials, Dresden, Germany

SYMPOSIUM FM

SMART AND INTERACTIVE TEXTILES - FROM NANO-ENGINEERED TEXTILE FIBRES TO INTEGRATED WEARABLE SYSTEMS

FM:KL Triboelectric Nanogenerators for Smart Textiles
ZHONG LIN WANG, Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, Beijing, China; School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA, USA

Session FM-1

Adaptive/Active Textiles

FM-1:IL01 Nanostructured Coatings for the Functionalization of Textiles
G. GENTILE¹, R. AVOLIO¹, R. CASTALDO¹, M. COCCA¹, F. DE FALCO¹, M.E. ERRICO¹, M. LAVORGNA², M. AVELLA¹, ¹Institute for Polymers Composites and Biomaterials - National Research Council of Italy, Pozzuoli (NA), Italy; ²Institute for Polymers Composites and Biomaterials - National Research Council of Italy, Portici (NA), Italy

FM-1:IL02 Textile Actuation - Its Mechanisms, Potentials and Challenges
N.-K. PERSSON^{1,2}, C. BACKE¹, M. ASADI MIANKAFSHE¹, L. GUO¹, E. JAGER³, T. BASHIR^{1,4}, ¹The Swedish School of Textiles, Polymeric E-textiles, University of Borås, Borås, Sweden; ²Smart Textiles, University of Borås, Borås, Sweden; ³Linköping University, Department of Physics, Chemistry and Biology (IFM), Sensor and Actuator Systems, Linköping, Sweden; ⁴Swedish Centre for Resource Recovery, University of Borås, Borås, Sweden

FM-1:IL03 Light Emitting Textiles: Innovative Product Development and Novel Functionality through Collaborative Manufacture and Co-design
S. ROBERTSON, Royal College of Art, London, UK; **S. TAYLOR**, Edinburgh Napier University, Edinburgh, UK

FM-1:IL04 Active Textile Poly (3, 4-ethylenedioxythiophene): poly (styrene sulfonate)/polypyrrole Coatings for Actuation
C. BACKE, L. GUO, N.-K. PERSSON, The Swedish School of Textiles, Polymeric E-textiles, University of Borås, Borås, Sweden

Session FM-2

e-Textiles

FM-2:IL01 A Hybrid Textile Electrode for Simultaneous Wireless ECG and Body Motion Measurement
G.K. STYLIOU, XIANG AN, Heriot Watt University, Research Institute for Flexible Materials, Galashiels, Selkirkshire, UK

FM-2:IL02 Wearable Biomechanical Energy Harvesting and Self-charging Smart Textiles
KAI DONG, Beijing Institute of Nanoenergy and Nanosystems, CAS, Beijing, China

FM-2:IL03 Bioelectronic Textiles: Materials and Systems
E. ISMAILOVA, Department of Bioelectronics, Ecole Nationale Supérieure des Mines de Saint Etienne, CMP-EMSE, MOC, Gardanne, France

FM-2:IL04 Exotic Functional e-textiles from Surface-area-enlarged Supercapacitor Yarns to Flexible Superconductor Yarns Using Carbon-nanotube Sheets as a Template
DONGSEOK SUH, Department of Energy Science, Sungkyunkwan University, Suwon, South Korea

FM-2:IL05 Seamless and Reliable Integration of Electronics and Sensors in Textiles

S.P. BEEBY, A.O. KOMOLAFE, R.N. TORAH, M.J. TUDOR, M. LI, H. NUNES-MATOS, School of Electronics and Computer Science, University of Southampton, Southampton, UK; D. HARDY, T. DIAS, Advanced Textiles Research Group, School of Art & Design, Nottingham Trent University, Nottingham, UK

FM-2:IL06 The Integration of Electronic Sensors and Systems into Textiles to Create the Next Generation of E-Textiles

R. TORAH, A. KOMOLAFE, K. YANG, Y. LI, J. TUDOR, S. BEEBY, University of Southampton, Southampton, UK

FM-2:IL07 Energy Harvesting and Storage with Electronic Textiles

A. SATHARASINGHE, **T. HUGHES-RILEY**, T. DIAS, Nottingham Trent University, Nottingham, UK

FM-2:IL08 Advances in Wearable Photovoltaic Fabrics

YONG K. KIM, University of Massachusetts Dartmouth, N. Dartmouth, MA, USA

FM-2:IL09 Dispenser Printing of Electrode Array for Healthcare Applications

Z. AHMED, M. LIU, N. GRABHAM, J. TUDOR, **KAI YANG**, Electronics and Computer Science, University of Southampton, Southampton, UK

Session FM-3

Functionality and applications

FM-3:IL01 Smart and Interactive Textiles - From Nano-engineered Textile Fibres to Integrated Wearable Systems

C. HUFFA, B. HUFFA, Fabdesigns, Inc., Malibu, CA, USA

FM-3:IL02 Finishing Treatments of Synthetic Fabrics to Reduce Microplastic Release During Washings

M. COCCA, F. DE FALCO, G. GENTILE, R. AVOLIO, M.E. ERRICO, E. DI PACE, M. AVELLA, Institute for Polymers, Composites and Biomaterials, National Research Council of Italy, Pozzuoli, NA, Italy

FM-3:IL03 Smart Encapsulating Devices for Stretchable Sportswear

M. MONTORSI, S. BARBI, R. GAMBERINI, Department of Science and Methods for Engineering, University of Modena and Reggio Emilia, Reggio Emilia, Italy; Interdepartmental center for industrial research and technology transfer in the field of integrated technologies for sustainable research, efficient energy conversion, energy efficiency of buildings, lighting and home automation, EN&TECH, University of Modena and Reggio Emilia, Reggio Emilia, Italy

FM-3:IL04 Electrospun Nanofibers as designed 3D-Structures for Nanomedicine

I. BONADIES, Institute for Polymers, Composites and Biomaterials (IPCB) - CNR, Pozzuoli (NA), Italy

FM-3:IL05 Integrated Printed Electronics into Fashion and Leisure Garments

A.T. CLAYPOLE, J.M. CLAYPOLE, A. HOLDER, **T.C. CLAYPOLE**, Welsh Centre for Printing and Coating, College of Engineering, Swansea University Bay Campus, Crymlyn Burrows, Swansea, UK

FM-3:IL06 E-Textiles Technologies and Application - Uniting Electronics and Textiles

M.VON KRSHIWOBLIZKI, C. KALLMAYER, C. DILS, Fraunhofer IZM, Berlin, Germany; M. SCHNEIDER-RAELOW, TU Berlin, Berlin, Germany

SYMPOSIUM FN

EMBODYING INTELLIGENCE IN STRUCTURES AND INTEGRATED SYSTEMS

Session FN-1

Smart Materials/Sensors/Actuators/MEMs/NEMs

FN-1:IL01 Nonlinear Dynamics, Stabilization and Control of Nano- and Micro- Electromechanical Systems

O. GOTTLIEB, Mechanical Engineering Nonlinear and Chaotic Dynamical Systems Group, Technion - Israel Institute of Technology, Haifa, Israel

FN-1:IL02 Modeling and Simulation of Electro-active Materials and Structures

M. KROMMER, E. HANSY-STAUDIGL, TU Wien, Vienna, Austria; A. HUMER, A. PECHSTEIN, Johannes Kepler University, Linz, Austria

FN-1:IL03 Experimental Characterization of a Smart Material via DIC

S. CASCIATI¹, D. BORTOLUZZI², A. COLNAGHI¹, L. ROSADINI¹, ¹SIART srl, Pavia, Italy; ²Consultant Engineer, Alpagro (BI), Italy

FN-1:IL04 Towards Earthquake-resilient Structures by Using Superelastic Shape Memory Alloys

SONGYE ZHU, Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Hong Kong, China

FN-1:IL05 Modeling and Identification of Nonlinear Piezoelectric Coefficients

M.R. HAJJ, Civil, Environmental and Ocean Engineering, Stevens Institute of Technology, NJ, USA; V. MEESALA, Engineering Mechanics Program, Virginia Tech, VA, USA

FN-1:IL06 Force-Transduction and Actuation in the Tooth-Stylet-Belt Radula System of Chitons

A. POHL, S.A. HERRERA, University of California Riverside, Riverside, CA, USA; D. RESTREPO, University of Texas at San Antonio, San Antonio, TX, USA; P. ZAVATTIERI, Purdue University, West Lafayette, IN, USA; D. KISAILUS, University of California Riverside, Riverside, CA, USA

FN-1:IL07 Large Deformation and Hysteresis in Non-linear Electro-mechanics

A. HUMER, A. PECHSTEIN, Johannes Kepler University, Linz, Austria; M. KROMMER, TU Wien, Vienna, Austria

FN-1:IL08 Effects of Incorporating Sugarcane Bagasse Ash (SCBA) in Mortar to Examine Durability of Sulfate Attack

A. JOSHAGHANI, Department of Civil Engineering, Texas A&M University, College Station, TX, USA

Session FN-2

Integration technologies

FN-2:IL01 Control of Random Rocking Dynamics of Multidimensional Structures

A.S. KOVALEVA, Space Research Institute, RAS, Moscow, Russia

FN-2:IL02 The Smart Potential of Vision-based Technology

L. FARAVELLI, Zhejiang University, Hangzhou, China; L. ROSADINI, SIART srl, Pavia, Italy

FN-2:IL03 Integration of Computer Vision with Deep Learning for Structural Health Monitoring and Condition Assessment

XIAO-WEI YE, T. JIN, Department of Civil Engineering, Zhejiang University, Hangzhou, China

Session FN-3

Smart structures and integrated systems

FN-3:IL01 Robotic Kummigbird: A Challenge to Integration

A. PREUMONT, A. ROSHANBIN, Department of Control Engineering and System Analysis, Université Libre de Bruxelles, Brussels, Belgium

FN-3:IL02 On the Use of Gyroscope and Accelerometer Sensors for Direct Displacement Measurements

YIZHENG LIAO, **A.S. KIREMIDJIAN**, K. BALAFAS, R. RAJAGOPAL, Stanford University, Stanford, CA, USA; H.-C. LOH, University of California San Diego, USA

FN-3:IL03 Efficient Method for Optimal Sensor Placement in Large-scale Structures

M. OSTROWSKI, B. BLACHOWSKI, A. SWIERCZ, P. TAUZOWSKI, Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland; P. OLASZEK, Road and Bridge Research Institute, Warsaw, Poland; L. JANKOWSKI, Institute of Fundamental Technological Research, Polish Academy of Sciences, Poland

FN-3:IL04 Structural Glass Panels: an Integrated System

G. BIDINI, L. BARELLI, C. BURATTI, G. CASTORI, E. BELLONI, **E. SPERANZINI**, University of Perugia, Department of Engineering, Perugia, Italy

Session FN-4

Ongoing and perspective applications

FN-4:IL01 Challenges toward the Enhancement of Seismic Resilience for Tokyo Metropolitan Area

AKIRA NISHITANI¹, K. KAJIWARA², T. NAGAE³, T. INOUE², K. KUSUNOKI⁴, I. NAKAMURA², K. HAYASHI⁵, M. KURATA⁶, Y. KAWAMATA², E. SATO²,
¹Waseda University, Tokyo, Japan; ²NIED, Japan; ³Nagoya University, Japan; ⁴University of Tokyo, Japan; ⁵Toyohashi University of Technology, Japan; ⁶Kyoto University, Japan

FN-4:IL02 Rail Bolt Joint Looseness Monitoring Using PZT Sensing Network

LU ZHOU^{1,2}, **YI-QING NI^{1,2}**, ¹Hong Kong Branch of National Transit Electrification and Automation Engineering Technology Research Center, The Hong Kong Polytechnic University, Hong Kong, China; ²Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Hong Kong, China

FN-4:IL03 Variational Bayesian Inference for Sparse Damage Identification of Structures

YONG XIA, XIAOYOU WANG, The Hong Kong Polytechnic University, Kowloon, Hong Kong; XIAOQING ZHOU, Shenzhen University, China

FN-4:IL04 Recent Developments in Structural Control Integration with Structural Health Monitoring

YING LEI, JUBIN LU, JINSHAN HUANG, Department of Civil Engineering, Xiamen University, Xiamen, China

FN-4:LO5 Semi-active Decentralized Vibration Damping Strategy in Two-dimensional Frame Structures

B. POPLAWSKI, G. MIKUŁOWSKI, Ł. JANKOWSKI, Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland

FN-4:LO6 Monitoring the Building Response during Borehole Excavation

A. COLNAGHI, L. ROSADINI, SIART srl, Pavia, Italy; G. MANACORDA, IDS GeoRadar srl, Pavia, Italy

Special Session FN-5

"Autonomic, Adaptive and Self-Sustaining Systems"

FN-5:IL01 New Strategies for Manufacturing Multifunctional Composites

M. GARG¹, P. CENTELLAS², J. MOORE², P. GEUBELLE², **N. SOTTOS¹**,
¹Materials Science and Engineering, University of Illinois Urbana Champaign, Urbana, IL, USA; ²Aerospace Engineering, University of Illinois Urbana Champaign, Urbana, IL, USA

FN-5:LO2 Bioinspired Multifunctional Materials with Embodied Intelligence for Self-adaptable Mechanical Properties and Regeneration

SUNG HOON KANG, Johns Hopkins University, Baltimore, MD, USA

FN-5:IL03 Biological Blueprints Towards Next Generation Multiscale Composites

A. POHL¹, T. WANG¹, W. HUANG¹, P. ZAVATTIERI², **D. KISAILUS¹**, ¹University of California, Riverside, CA, USA; ²Purdue University, USA

FN-5:LO4 Bio-inspired Local Morphing and its Enhancement through Parametric Resonance

G. LANZARA, Y. CHEN, University of Rome, RomaTre, Rome, Italy; S. CATARCI, B. CARBONI, A. ARENA, W. LACARBONARA, Sapienza University of Rome, Rome, Italy

FN-5:LO5 Local Multiphysics Studies of Nanostructured Materials

I. CHASIOTIS, S. LEE, Aerospace Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA

FN-5:LO6 Ionically Reconfigurable Multifunctional Perovskite Optoelectronics via Gated Carbon Nanotubes

D. GETZ², R. HAROLDSON¹, M. ALAHBAKHSHI¹, D. SARANIN³, **A. ZAKHIDOV^{1,2}**, ¹University of Texas at Dallas, US; ²ITMO University, St. Petersburg, Russia; ³NUST MISIS, Moscow, Russia

FN-5:IL07 Twist-based Refrigeration Using Twisted and Coiled Artificial Muscles

R. WANG^{1,2}, S. FANG², Z. LIU^{1,2}, **R.H. BAUGHMAN²**, ¹Key Laboratory of Functional Polymer Materials, Nankai University, Tianjin, China; ²Alan G. MacDiarmid NanoTech Institute, the University of Texas at Dallas, Dallas, TX, USA

FN-5:LO8 An Active Mechanical Willis Metamaterial With Asymmetric Polarizabilities

GUOLIANG HUANG, Department of Mechanical and Aerospace Engineering, University of Missouri, Columbia, MO, USA

FN-5:LO9 Embodying Intelligence in Materials via Dynamic Multistable Energy Landscapes

H. YASUDA, L.M. KORPAS, R. YIN, **J.R. RANEY**, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, PA, USA

FN-5:LO10 Chemomechanics of Gels

H. ZHANG¹, J. CHEN¹, J. HUANG², **YUHANG HU^{1,2}**, ¹School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA, USA; ²School of Chemical and Biomolecular Engineering, Georgia Institute of Technology, Atlanta, GA, USA

FN-5:IL11 Smart Skin for Robots

C. LIU¹, X. CHEN¹, T. TOPAC², **FU-KUO CHANG²**, ¹Department of Mechanical Engineering, Stanford University, Stanford, CA, USA; ²Department of Aeronautics and Astronautics, Stanford University, Stanford, CA, USA

FN-5:LO12 Optoelectronic Sensing of the Deformation Followed by Localized Computing and Actuation Responses in Soft Material Composites

R.F. SHEPHERD, Cornell University, Mechanical & Aerospace Engineering, Ithaca, NY, USA

FN-5:LO13 Bio-inspired Shape Memory Alloy Actuator Configurations and Actuation Schemes

D. HARTL, J. MINGEAR, P. LEAL, Department of Aerospace Engineering, Texas A&M University, College Station, TX, USA

FN-5:IL14 Functionality and Comparison of Avian-inspired Feather-like Sensors

L.L. GAMBLE, R. TU, H.A. SODANO, D.J. INMAN, University of Michigan, Ann Arbor, MI, USA

FN-5:IL15 Developing a Virtual Damage Sensor Using a Coupled Electro-mechanical FE Model of a Piezoelectric Material

S. GHOSH, P. TARAFDER, S. DAN, Johns Hopkins University, Baltimore, MD, USA

FN-5:LO16 Gradient Interface for High Temperature Sensor Modules

A.K. ROY¹, J. FERGUSON¹, S. SHENOGIN², S. GANGULI¹, J. JONES, ¹Air Force Research Laboratory; ²University of Dayton Research Institute

FN-5:LO17 Additive Manufacturing of Functional Polymers

R. TU, **H.A. SODANO**, Aerospace Engineering, University of Michigan, Ann Arbor, MI, USA

FN-5:IL18 Multi-material Multi-method 3D Printing for Multifunctional Composites and Devices

D. ROACH, X. KUANG, **H. JERRY QI**, Georgia Institute of Technology, Atlanta, GA, USA

SYMPOSIUM FO

**BIOLOGICAL, BIOHYBRID AND
 BIOINSPIRED MATERIALS: FROM
 ELECTRONICS AND PHOTONICS TO
 MEDICINE**

Session FO-1

**Materials (bio)synthesis, structure and chemical
 modification**

FO-1:IL01 Living Materials - Technology of the Future from Forms of the Past

F. OMENETTO, Silklab, Laboratory for Living Devices, Tufts University, Medford, MA, USA

FO-1:IL02 Intra Membrane Photo Mechanical Switches

C. BERTARELLI, Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta", Politecnico di Milano, Milano, Italy; Center for Nano Science and Technology, Istituto Italiano di Tecnologia, Milano, Italy

FO-1:LO3 Photosynthetic Enzymes for Energy Conversion

R. RAGNI, G. BUSCEMI, D. VONA, A. AGOSTIANO, G.M. FARINOLA, Chemistry Department, University of Bari Aldo Moro, Bari, Italy; F. MILANO, M. TROTTA, IPCF CNR, UOS Bari, Bari, Italy

FO-1:IL04 Influence of the Ageing of a C-N-TiO₂ Photocatalyst Produced by a Bioinspired Process in the Degradation of HDPE Microplastics
A.F. GÓMEZ-MUÑOZ¹, A.M. HUERTA-FLORES¹, C. SILIGARDI², E.I. CEDILLO-GONZÁLEZ¹, ¹Universidad Autónoma de Nuevo León, Laboratorio de Materiales III, Monterrey, N.L., México; ²Università degli Studi di Modena e Reggio Emilia, Dipartimento di Ingegneria Enzo Ferrari, Modena, Italy

FO-1:IL05 Obtainment of a C-N-TiO₂ Photocatalyst by a Bioinspired Route using Saltwater Mollusks: Material's Characteristics and its Application for the Degradation of Contaminants of Emerging Concern
E.I. CEDILLO-GONZÁLEZ, Universidad Autónoma de Nuevo León, Facultad de Ciencias Químicas, Monterrey, N.L., México; J.F. VILLAREAL-CHIU, Centro de Investigación en Biotecnología y Nanotecnología, Apodaca, N.L., México; I. JUÁREZ-RAMÍREZ, A.M. HUERTA-FLORES, Universidad Autónoma de Nuevo León, Instituto de Ingeniería Civil, San Nicolás de los Garza, N.L., México; P.E. SAUCEDO-LASTRA, Centro de Investigaciones Biológicas del Noroeste, La Paz, B.C.S. México; C. SILIGARDI, Università degli Studi di Modena e Reggio Emilia, Dipartimento di Ingegneria Enzo Ferrari, Modena, Italy

FO-1:IL06 Evaluation of the Photocatalytic Properties of a Bioinspired TiO₂-based Photocatalyst Prepared Using Proteins as Doping Source
I.B. SANDOVAL-HERRERA, Universidad Autónoma de Nuevo León, Facultad de Ciencias Químicas, Monterrey, N.L., México; I. JUÁREZ-RAMÍREZ, A.M. HUERTA-FLORES, Universidad Autónoma de Nuevo León, Instituto de Ingeniería Civil, San Nicolás de los Garza, N.L., México; C. SILIGARDI, Università degli Studi di Modena e Reggio Emilia, Dipartimento di Ingegneria Enzo Ferrari, Modena, Italy; E.I. CEDILLO-GONZÁLEZ, Universidad Autónoma de Nuevo León, Facultad de Ciencias Químicas, Monterrey, N.L., México

Session FO-2

Electronic devices with biological and bio-inspired materials

FO-2:IL01 Plant Based Biohybrid Systems

E. STAVRINIDOU, Laboratory of Organic Electronics, Department of Science and Technology, Linköping University, Norrköping, Sweden

FO-2:IL02 Bio-inspired Optical Designs for Photovoltaics

B. FRITZ¹, R. HÜNIG², B. GUO¹, S. YU¹, L. BORGMANN³, M. SCHNEIDER³, D. THEOBALD¹, O. SALOMON², P. JACKSON², M. POWALLA^{1,2}, U. LEMMER^{1,3}, M. GUTTMANN³, A. COLSMANN¹, H. HÖLSCHER³, **G. GOMARD**^{1,3}, ¹Light Technology Institute, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; ²Center for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW), Stuttgart, Germany; ³Institute of Microstructure Technology, Karlsruhe Institute of Technology (KIT), Eggenstein-Leopoldshafen, Karlsruhe, Germany

FO-2:IL03 Eumelanin-based Electrodes for Biocompatible ITO-free Devices

L. MIGLIACCIO^{1,2}, P. MANINI¹, P. TASSINI¹, M.G. MAGLIONE¹, **A. PEZZELLA**², ¹ENEA Agenzia Nazionale per Le Nuove Tecnologie l'Energia e lo Sviluppo Economico Sostenibile, SSPT-PROMAS-NANO, C.R.Portici, Portici, NA, Italy; ²Università degli Studi di Napoli Federico II, Department of Chemical Sciences, Napoli, Italy

FO-2:IL04 Photo Bio Electrochemical Systems - Development and Possible Areas of Application

P. BOMBELLI, Department of Biochemistry, University of Cambridge, Cambridge, UK

FO-2:IL05 Engineering of Nanostructured Materials through Cellulose Mineralization

I. POSTNOVA, **Y. SHCHIPUNOV**, Institute of Chemistry, Far East Department, Russian Academy of Sciences, Vladivostok, Russia

FO-2:IL06 A Bioinspired Synthetic Hybrid Ion Pump for Ultrasensitive Tactile Sensors

V. AMOLI, J.S. KIM, E. JEE, S.Y. KIM, J. KOO, H. CHOI, Y.S. CHUNG, Y. KIM, **DO HWAN KIM**, Hanyang University, Seoul, South Korea

Session FO-3

Photonic devices with biological and bio-inspired materials

FO-3:IL01 Measuring Cellular Dynamics with Microlaser-based Sensors

M. SCHUBERT¹, L. WOOLFSON¹, I.R.M. BARNARD¹, A.M. DORWARD², B. CASEMENT¹, A. MORTON¹, G.B. ROBERTSON², G.B. MILES³, C.S.

TUCKER⁴, S.J. PITT², **M.C. GATHER**^{1,5}, ¹SUPA, School of Physics and Astronomy, University of St Andrews, UK; ²School of Medicine, University of St Andrews, UK; ³School of Psychology & Neuroscience, University of St Andrews, UK; ⁴The Queen's Medical Research Institute, University of Edinburgh, UK; ⁵Centre for NanoBioPhotonics, Dept. für Chemie, University of Cologne, Köln, Germany

FO-3:IL02 Photosynthesis Enhancement in Diatom Microalgae by Photoactive Molecules

C. D'ANDREA^{1,2}, G. LEONE³, G. DE LA CRUZ VALBUENA^{1,2}, S.R. CICCÒ³, D. VONA³, E. ALTAMURA³, R. RAGNI³, E. MOLOTOKAITE², M. CECCHIN⁴, S. CAZZANIGA⁴, M. BALLOTTARI⁴, G. LANZANI^{1,2}, G.M. FARINOLA³, ¹Department of Physics, Politecnico di Milano, Milano, Italy; ²Center for NanoScience and Technology @PoliMi, Istituto Italiano di Tecnologia, Italy; ³Department of Chemistry University of Bari, Italy; ⁴Department of biotechnology, University of Verona, Italy

FO-3:IL03 Engineering Hierarchical Architectures for Bio-Inspired Photonics

N. STINGELIN, Georgia Institute of Technology, Atlanta, GA, USA

FO-3:IL04 Bio-inspired Polymer Nanostructures for Photonics: Novel Opportunities from Lasing to Sensing

D. COMORETTO, P. LOVA, Dipartimento di Chimica e Chimica Industriale, Università di Genova, Genova, Italy

FO-3:IL05 Bacterial Photosynthetic Reaction Centers in Optoelectronic Devices

F. MILANO, M. TROTTA, CNR-IPCF, UOS Bari, Bari, Italy; R. RAGNI, D. VONA, A. AGOSTIANO, G.M. FARINOLA, Chemistry Department, University of Bari Aldo Moro, Bari, Italy

FO-3:IL06 Multi-functionality of Colored Insect Scales

J. SYURIK, R. THELEN, G. GOMARD, **H. HÖLSCHER**, Institute of Microstructure Technology, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany

FO-3:IL07 Colour with a Twist: Form Nature to Applications

S. VIGNOLINI, Department of Chemistry, University of Cambridge, Cambridge, UK

FO-3:IL08 Hybrid Plasmonic/Photonic Crystals for Optical Detection of Bacterial Contaminants

G.M. PATERNÒ¹, L. MOSCARDI^{1,2}, S. DONINI¹, D. ARIODANTI³, I. KRIEGEL⁴, E. PARISINI¹, G. LANZANI^{1,2}, F. SCOTOGNELLA^{1,2}, ¹Center for Nano Science and Technology@PoliMi, Istituto Italiano di Tecnologia, Milano, Italy; ²Dipartimento di Fisica, Politecnico di Milano, Milano, Italy; ³Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta", Milano, Italy; ⁴Department of Nanochemistry, Istituto Italiano di Tecnologia (IIT), Genova, Italy

FO-3:IL09 Multifunctional Optical Materials in Nature: Vapour-sensing Photonic Structures and the Role of Disorder

B. WILTS, Adolphe Merkle Institute, University of Fribourg, Fribourg, Switzerland

FO-3:IL10 Biohybrids from Microalgae: A New Generation Material

D. VONA¹, R. RAGNI¹, S.R. CICCÒ², G. LEONE¹, M. LO PRESTI¹, **G.M. FARINOLA**¹, ¹Dipartimento di chimica, Università degli Studi di Bari "Aldo Moro", Bari, Italy; ²Istituto per la chimica dei composti organometallici (CNR-ICCOM)-Bari, Bari, Italy

Session FO-4

Bio-medical devices with biological and bio-inspired materials

FO-4:IL01 A New in Vivo Model for Bioelectronics

C. TORTIGLIONE, Istituto di Scienze Applicate e Sistemi Intelligenti, Consiglio Nazionale delle Ricerche, Pozzuoli, Italy

FO-4:IL02 A Photothermal Lateral Flow Test for Visual Point of Care Detection

J.M. DE LA FUENTE, Instituto de Ciencia de Materiales de Aragón, CSIC-University of Zaragoza & CIBER-BBN, Zaragoza, Spain

FO-4:IL03 Engineering Biogenic Porous Silica Nanovectors for Theranostic Applications

L. DE STEFANO, G. CHIANESE, **C. TRAMONTANO**, I. REA, IMM-CNR, Napoli, Italy; M. TERRACCIANO, University of Naples "Federico II", Italy

FO-4:IL04 Nanotubes on Shape Memory NiTi Surfaces and their Functionalization with Anti-biofouling Brushes. Towards Smart Device Surfaces

M. ES-SOUNI, IMST, Kiel University of Applied Sciences, Kiel, Germany

FO-4:IL05 Biohybrid Electrospun Membrane for the Filtration of Nonsteroidal Anti-inflammatory Drugs from Water

E. PARISINI¹, R. CASTAGNA², S. DONINI¹, P. COLNAGO², A. SERAFINI², C. BERTARELLI^{1,2}, ¹Center for Nano Science and Technology @PoliMi, Istituto Italiano di Tecnologia, Milano, Italy; ²Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta", Politecnico di Milano, Milano, Italy

FO-4:IL06 Optomechanical Sensing in Wearables and Medical Textiles

M. KOLLE, J. Sandt, A. Leber, Massachusetts Institute of Technology, Cambridge, MA, USA

FO-4:IL07 Learning from Nature: Bioinspired Materials and Strategies for the Design of Bio-functional Materials

G. LUCIANI, Department of Chemical, Materials and Industrial Production Engineering, University of Naples Federico II, Naples, Italy

FO-4:IL08 Hybrid Nanomaterials for Biomedical Applications: Targeting and Photothermia

H. BELKAHLA¹, E. MAZARIO¹, R. BOUDJEMAA², J.S. LOMAS¹, O. MICHEAU³, C. WILHELM⁴, H. RANDRIAMAHAZAKA¹, **M. HÉMADI**¹, ¹Université de Paris, ITODYS, CNRS-UMR 7086, Paris Cedex, France; ²Abbelight, Paris, France; ³Lipides nutrition cancer, INSERM UMR-1231, Université de Bourgogne Franche-Comté, UFR Science de Santé, Dijon, France; ⁴Laboratoire Matières et Systèmes Complexes, Université de Paris, CNRS-UMR 7057, Paris Cedex, France

FO-4:IL09 From Static to Dynamic 3D Bioelectronic Interfaces

F. SANTORO, Tissue Electronics, Istituto Italiano di Tecnologia, Naples, Italy

**FP - 13th International Conference
MEDICAL APPLICATIONS OF
ADVANCED BIOMATERIALS AND
NANO-BIOTECHNOLOGY**

FP:KL Goodbye Hospitals and Hello Implantable Nanosensors

T.J. WEBSTER, Department of Chemical Engineering, Northeastern University, Boston, MA, USA

**Session FP-1
Advances in Biomaterials**

FP-1:IL01 Pseudo-proteins - Synthetic Analogues of Proteins for Biomedical Applications

R.KATSARAVA, Institute of Chemistry and Molecular Engineering, Agricultural University of Georgia, Tbilisi, Georgia

FP-1:IL02 Mechanically-interlocked Macromolecules Exploring Frontier in Biomaterials

NOBUHIKO YUI, A. TAMURA, Y. ARISAKA, Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University, Tokyo, Japan

FP-1:IL03 Biocompatible PEG Hydrogels for Biomedical Applications

Y. BU, **DECHENG WU**, Institute of Chemistry, Chinese Academy of Sciences, Beijing, China

FP-1:IL04 Integration of Supermolecule-based Biointerfaces and Growth Factors for Manipulating Cell Functions

YOSHINORI ARISAKA, N. YUI, Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University, Chiyoda, Tokyo, Japan

FP-1:IL05 New Organic/Inorganic Macroporous Nanocomposite Scaffolds by Freeze-casting for Bone Tissue Engineering

P. LAGARRIGUE, J. SOULIE, D. GROSSIN, C. COMBES, CIRIMAT, Université de Toulouse, CNRS, Toulouse INP-ENSIACET, Toulouse, France; A. BETHRY, V. DARCOS, IBMM, Université de Montpellier, CNRS, ENSCM, Montpellier, France; A. DUPRET-BORIES, IUCT-Oncopole, Toulouse, France

FP-1:IL06 Enhanced Sealing Strength of Hydrophobically-modified Fish Gelatin-based Adhesives

TETSUSHI TAGUCHI, Biomaterials Field, Research Center for Functional Materials (NIMS), Tsukuba, Japan

FP-1:IL07 Isothermal Shape Change by Enzymatic Trigger

P.T. MATHER, Bucknell University, Lewisburg, PA, USA; J.H. HENDERSON, S.L. BUFFINGTON, Syracuse University, USA

FP-1:IL08 Carbonate Apatite Artificial Bone Replacement

KUNIO ISHIKAWA, K. HAYASHI, A. TSUCHIYA, R. KISHIDA, Department of Biomaterials, Faculty of Dental Science, Kyushu University, Fukuoka, Japan

FP-1:IL09 Functionalisation of Surfaces in Porous Ceramic Structures and 3D Flow Visualization

K. REZWAN, University of Bremen, Advanced Ceramics, Bremen, Germany

FP-1:IL10 3D Printing of Ceramic Bio-inks with Embedded Cells via Hydrogel/Ceramic Nanocomposites

J. MAINARDI, K. REZWAN, **M. MAAS**, Advanced Ceramics, University of Bremen, Bremen, Germany

FP-1:IL11 Nanomaterials with Tunable Properties for Drug Delivery

S. MAJD, University of Houston, Biomedical Engineering, Houston, TX, USA

FP-1:IL12 New Bioactive Glasses with Therapeutic Ions to Tailor Specific Functionalities

R. SERGI, D. BELLUCCI, **V. CANNILLO**, Dipartimento di Ingegneria "E. Ferrari" Università di Modena e Reggio Emilia, Modena, Italy

FP-1:IL13 Micro-slurry Jet Erosion of Lithium Metasilicate Glass-ceramic Surfaces for Reliable Dental Restorations

LING YIN, School of Mechanical Engineering, The University of Adelaide, Adelaide, SA, Australia; T. BABA, Graduate School of Science and Technology, Kumamoto University, Kumamoto, Japan; Y. NAKANISHI, Faculty of Advanced Science and Technology, Kumamoto University, Kumamoto, Japan

FP-1:IL14 Bacterial Cellulose as Functionalised Scaffold for Ceramic and Metallic Particles

S. BARBI, F. BARBIERI, C. TAURINO, M. GULLO, M. MONTORSI, Department of Science and Methods for Engineering, University of Modena and Reggio Emilia, Reggio Emilia, Italy; Interdepartmental center for applied research and services in advanced mechanics and motoring, INTERMECH-Mo.Re., University of Modena and Reggio Emilia, Modena, Italy; cAsk Industries S.p.A., Reggio Emilia, Italy; Department of Life Sciences, University of Modena and Reggio Emilia, Reggio Emilia, Italy; Interdepartmental center for industrial research and technology transfer in the field of integrated technologies for sustainable research, efficient energy conversion, energy efficiency of buildings, lighting and home automation, EN&TECH, University of Modena and Reggio Emilia, Reggio Emilia, Italy

FP-1:IL15 In Vitro Assessment of Ion-doped Bioactive Glasses for Bone Tissue Engineering: Silicate vs Silicon Oxycarbide-based Systems

A.R. BOCCACCINI¹, M. ARANGO-OSPINA¹, F. XIE², R. RIEDEL², I. GONZALO-JUAN², E. IONESCU², ¹Institute of Biomaterials, University of Erlangen-Nuremberg, Erlangen, Germany; ²Institute for Materials Science, Technische Universität Darmstadt, Darmstadt, Germany

FP-1:IL16 Development of Antibacterial Apatite Nanoparticles Suitable for Device Coating

TSUTOMU FURUZONO, Department of Biomedical Engineering, Faculty of Biology-Oriented Science and Technology, Kindai University, Wakayama, Japan

FP-1:IL17 Development and Characterization of Bioactive Glass Containing Fibrous Scaffolds

R. SERGI, V. CANNILLO, Department of Engineering "Enzo Ferrari", University of Modena and Reggio Emilia, Modena, Italy; L. LIVERANI, A.R. BOCCACCINI, Institute of Biomaterials, Department of Materials Science and Engineering, University of Erlangen-Nuremberg, Erlangen, Germany

FP-1:IL18 Interaction of Boron-rich Boron Carbide Nanoparticles with RAW264.7 Phagocytic Cells

D. KOZIEN¹, B. SZERMER-OLEARNIK², N. ANGER², T. GOSZCZYNSKI², A. RAPAK², J. BORATYNSKI², E. PAJTASZ-PIASECKA², M. BUČKO¹, ¹Faculty of Material Science and Ceramics, AGH University of Science and Technology, Kraków, Poland; ²Ludwik Hirszfeld Institute of Immunology and Experimental Therapy, Polish Academy of Sciences, Wrocław, Poland

FP-1:IL19 From in vitro Evolution of New Bioactive Amorphous Calcium Ortho/Pyrophosphate Materials in Various Acellular/Cellular Media to in vivo Animal Study

M. DESBORD, C. COMBES, O. MARSAN, C. REY, J. SOULIÉ, CIRIMAT, Université de Toulouse, CNRS, Toulouse INP - ENSIACET, Toulouse, France; R. SIADOUS, J. AMÉDÉE, A. LEROUX, BioTis, Université de Bordeaux, Inserm 1026, Bordeaux, France ; R. LANDON, F. ANAGNOSTOU, B3OA, Université Paris Diderot, CNRS, Inserm, Faculté de Médecine Paris Diderot Site Villemin, Paris, France

FP-1:IL20 Smart Surface Functionalization of Titanium for Osseo-integrative Implants

L.A. ROCHA, DTx - Digital Transformation CoLab and IBTN/Br, Brazilian Branch of the Institute of Biomaterials, Tribocorrosion and Nanomedicine, Guimarães, Portugal

FP-1:IL21 Growing Integration Layer [GIL] Strategy for Bio-active Ceramic Coating on Metallic Alloys

MASAHITO YOSHIMURA^{1,2}, CHI-HUANG HUANG¹, ¹Hi-GEM & PCGMR, Materials Science and Engineering, National Cheng Kung University, Tainan, Taiwan; ²Tokyo Institute of Technology, Tokyo, Japan

Session FP-2

Tissue Engineering and Regenerative Medicine

FP-2:IL01 Nanomaterials for Morphogen Delivery and Skeletal Tissue Engineering

E. JABBARI, Biomaterials and Tissue Engineering Laboratory, Department of Chemical Engineering, University of South Carolina, Columbia SC, USA

FP-2:IL02 Multi-functional Scaffolds of Gold Nanoparticles and Gelatin for Photothermal Therapy and Tissue Engineering

GUOPING CHEN, X. WANG, N. KAWAZOE, Research Center for Functional Materials, National Institute for Materials Science, Tsukuba, Japan

FP-2:IL03 Elaboration of Copper-doped Hydroxyapatite for Biomedical Applications

T. BAZIN^{1,2}, I. JULIEN¹, A. DEMOURGUES², E. CHAMPION¹, M. GAUDON², ¹Univ. de Limoges, CNRS, Institut de Recherche sur les Céramiques, UMR 7315, Limoges, France; ²Univ. de Bordeaux, CNRS, Institut de Chimie de la Matière Condensée de Bordeaux, UMR 5026, Pessac, France

FP-2:IL04 Tissue-mimicking Scaffolds for Adipose Tissue Engineering

N. CONTESSI NEGRINI, **S. FARÈ**, Politecnico di Milano, Dept. Chemistry, Materials and Chemical Engineering G. Natta, Milano, Italy. National Interuniversity Consortium of Materials Science and Technology (INSTM), Italy

FP-2:IL05 Nitric Oxide-releasing Biomaterials for Cardiovascular Regeneration

QIANG ZHAO, State key Laboratory of Medicinal Chemical Biology, College of Life Sciences, Nankai University, Tianjin, China

FP-2:IL06 Endothelial Cells Network Formation on the Decellularized Tissue Hydrogels

AKIO KISHIDA, J. KADOTA, N. NAKAMURA, Y. HASHIMOTO, T. KIMURA, Inst Biomat Bioeng, Tokyo Medical and Dental University, Chiyoda-ku, Tokyo, Japan

FP-2:IL07 PCL-based Matrices for Guided Tissue Regeneration

JIN HO LEE, Department of Advanced Materials, Hannam University, Daejeon, South Korea

FP-2:IL08 Bioceramics for Bone Regeneration and Beyond

JIANG CHANG, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, China

FP-2:IL09 Design of Implantable Microfluidic Device Based on Polyacrylamide Hydrogel for Kidney Replacement

M. TAMER^{1,2}, M. BASSIL², M. BECHELANY¹, S. BALME¹, P. MIELE¹, M. EL TAHCHI², ¹European Institute of Membranes, ENSCM, CNRS, University of Montpellier, France; ²Laboratory of Biomaterials and Intelligent Materials, Dept. of Physics, Lebanese University, Faculty of Sciences II, Jdeidet, Liban

FP-2:IL10 Developing Multifunctional Scaffolds for Regenerating Complex Human Body Tissues

MIN WANG, Department of Mechanical Engineering, The University of Hong Kong, Hong Kong

Session FP-3

Smart drug/biomolecule/gene delivery systems and bioimaging

FP-3:IL01 Smart Stimuli-sensitive Combination Nanopreparations: Next Generation of Drug Delivery Systems

V.P. TORCHILIN, Center for Pharmaceutical Biotechnology and Nanomedicine, Northeastern University, Boston, MA, USA

FP-3:IL02 Systemic Delivery of Cyclodextrins by Supramolecular Polyrotaxanes for the Treatment of Metabolic and Inflammatory Diseases

ATSUSHI TAMURA, N. YUI, Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University, Tokyo, Japan

FP-3:IL03 Intelligent Release of Functional Molecules Encapsulated in Complex Electrospun Polymer Fibers for Chem/Bio/Medical Applications

A.J. STECKL, D. HAN, S. TORT, University of Cincinnati, Cincinnati, OH, USA

FP-3:IL04 Novel Supramolecular Self-assembled Nano-carrier Systems for Drug and Gene Delivery

JUN LI, Department of Biomedical Engineering, National University of Singapore, Singapore

FP-3:IL05 Biodegradable Particulate System for Efficient Non-invasive Transdermal Drug Delivery

Y.I. SVENSKAYA, E.V. LENGERT, V.V. TUCHIN, Saratov State University, Saratov, Russia; E.E. TALNIKOVA, Saratov State Medical University, Saratov, Russia; D.A. GORIN, Skolkovo Institute of Science and Technology, Moscow, Russia; G.B. SUKHORUKOV, Queen Mary University of London, London, UK

FP-3:IL06 Polymeric Photodefinable Microneedle Based Systems for Theranostics

P. DARDANO, I. REA, L. DE STEFANO, IMM-CNR, Naples, Italy; S. DE MARTINO, M. BATTISTI, Materials, Naples, Italy

FP-3:IL07 Indocyanine Green (ICG) Liposomal and Micellar Formulations in Photodynamic Antitumor Therapy

U. BAKOWSKY, L. DUSE, K. ENGELHARDT, M. RASCHPICHLER, E. PREIS, M. WOJCIK, Department of Pharmaceuticals and Biopharmaceutics, Philipps University Marburg, Marburg, Germany

Session FP-4

Clinical applications

FP-4:IL01 Clinical Translation in Regenerative Engineering

C.T. LAURENCIN, Connecticut Convergence Institute for Translation in Regenerative Engineering, University of Connecticut, Health Center Farmington, CT, USA

FP-4:IL02 The Applications of Nanobiotechnology for the Isolation and Imaging of Circulating Tumor Cells

Chiung Wen Kuo, **PEILIN CHEN**, Research Center for Applied Sciences, Academia Sinica, Taipei, Taiwan

FP-4:IL03 What Have we Learned from Bone? Bio-inspired Biomaterials and Approaches for Musculoskeletal Tissue Engineering Translations

YUNZHI P. YANG, Departments of Orthopedic Surgery, (by courtesy) Materials Science and Engineering, and Bioengineering, Stanford University, Stanford, CA, USA

Focused Session FP-6

Next Generation Implantable Neural Interfaces - Developments in Materials and Technology

FP-6:IL01 Electronic Materials and Devices for Neural Interfaces

M.R. ABIDIAN, Biomedical Engineering, University of Houston, Houston, TX, USA

FP-6:IL02 Glial Interfaces: Materials, Devices and Approaches to Probe and Sense the "Other Brain".

E. SARACINO¹, D. POLESE², D. SPENNATO¹, R. FABBRI¹, A.I. BORRACHERO-CONEJO^{3,4}, V. GUARINO⁵, G.P. NICCHIA⁶, M. MUCCINI⁸, G. FORTUNATO², L. AMBROSIO², R. ZAMBONI¹, A. CONVERTINO², L. MAIOLO², **V. BENFENATI**¹, ¹CNR-ISOF, Istituto per la sintesi organica e la fotoreattività, Bologna, Italy; ²CNR-IMM, Istituto per la Microelettronica e Microsistemi; ³CNR-ISMN, Istituto per lo Studio dei Materiali Nanostrutturati, Bologna, Italy; ⁴Vanderbilt University Dept. Biomedical Engineering, Nashville, TN, USA; ⁵CNR-IPCB, Istituto per i Polimeri Compositi e Biomateriali, Napoli, Italy; ⁶Università di Bari, Dept of Biotechnology Biosciences and Biopharmaceutics, Bari, Italy

FP-6:IL03 Hydrogel-based Devices for Soft Neural Interfaces

J. MACRON, N. ALWAHAB, K. GALAN, M. SHUR, A. BICHAT, S.P. LACOUR, Bertarelli Foundation Chair in Neuroprosthetic Technology, Laboratory for Soft Bioelectronic Interfaces, Centre for Neuroprosthetics, Ecole Polytechnique Fédérale de Lausanne (EPFL), Geneva, Switzerland

FP-6:IL04 Amyloidogenic Beta-sheet Fluorescent Fibers Probes

B. APTER, B. FAINBERG, Faculty of Engineering, Holon Institute of Technology, Holon, Israel; A. ACCARDO, C. DIAFERIA, G. MORELLI, Department of Pharmacy, Research Centre on Bioactive Peptides (CIRPeB), University of Naples "Federico II", Naples, Italy; **G. ROSENMAN**, School of Electrical Engineering, Tel Aviv University, Tel Aviv, Israel

FP-6:IL05 Advanced Materials for Interfacing with Small Nerves and Neurovascular Plexi

M. ROMERO-ORTEGA, Departments of Biomedical Engineering and Biomedical Sciences Colleges of Engineering and Medicine Health, University of Houston, Houston, TX, USA

FP-6:IL06 Interfacing Living Matter with Nanowires

A. CONVERTINO, Istituto per la Microelettronica e i Microsistemi, CNR, Roma, Italy

FP-6:IL07 Wireless Photovoltaic Neuroprostheses for Artificial Vision
D. GHEZZI, Center for Neuroprosthetics and Institute of Bioengineering, School of Engineering, École Polytechnique Fédérale de Lausanne, Geneva, Switzerland

FP-6:IL08 Retinal Prosthesis toward High Resolution
JUN OHTA, Nara Institute of Science and Technology, Ikoma, Nara, Japan

FP-6:IL09 The Role of Ultra-flexible Electronics in Developing Advanced Brain Computer Interfaces

L. MAIOLO, A. CONVERTINO, F. MAITA, D. POLESE, G. FORTUNATO, Istituto per la Microelettronica e Microsistemi - Consiglio Nazionale delle Ricerche (IMM-CNR), Roma, Italy

FP-6:IL10 Subcellular-resolution in-vitro Electrophysiology with CMOS-based Microelectrode Arrays

A. HIERLEMANN, ETH Zurich, Department Biosystems Science and Engineering, Basel, Switzerland

FP-6:IL11 Organic Nanotechnology for Optical Modulation of Living Systems, from Genesis to Specific Functions

M.R. ANTOGNAZZA, Center for Nano Science and Technology, Italian Institute of Technology, Milano, Italy

Focused Session FP-7

Progress in Wireless Body Sensor Networks for Healthcare Applications

FP-7:IL01 New Developments in Implantable Wireless Optofluidic Neural Probes

JAE-WOONG JEONG, School of Electrical Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea

FP-7:IL02 Printed Wearable Metasurfaces for Wireless On-body Sensors

S. GENOVESI, F. COSTA, A. TOGNETTI, Dipartimento di Ingegneria dell'Informazione, University of Pisa, Pisa, Italy

FP-7:IL03 Bidirectional Communication Strategy in Bioelectronics for Retinal Prosthesis

W. MOKWA, Institute of Materials in Electrical Engineering I, RWTH Aachen University, Aachen, Germany

FP-7:IL04 Skin-attachable Wearable Sensors

HYUNHYUB KO, Ulsan National Institute of Science and Technology, Ulsan, South Korea

FP-7:IL05 Textile-based Deformation and Flexion Sensors for Motion Analysis and Human Machine Interaction

A. TOGNETTI, Dipartimento di Ingegneria dell'Informazione, University of Pisa, Pisa, Italy

FP-7:IL06 New Carbon Based Implantable Devices for Biomedical Applications

G. BLUGAN, P. VALLACHIRA WARRIAM SASIKUMAR, Laboratory of High Performance Ceramics, Empa, Swiss Federal Laboratories for Material Science and Technology, Dübendorf, Switzerland

FP-7:IL07 Non-invasive, Wearable Diagnostics by Printed Biochemical Sensors

A. ZÖRNER¹, S. OERTEL¹, K. QUINT², T. BERTSCH³, **M.P.M. JANK**¹, ¹Fraunhofer Institute for Integrated Systems and Device Technology, Erlangen, Germany; ²Quint Healthcare, Cadolzburg, Germany; ³Institute for Clinical Chemistry, Laboratory Medicine and Transfusion Medicine, General Hospital Nuremberg, Paracelsus Medical University, Nuremberg, Germany

FP-7:IL08 Minimally Invasive Health Monitoring by Smart Systems

A. KIRCHHAIN, A. BONINI, F. VIVALDI, N. POMA, D. SANTALUCIA, Z. ATES, **F. DI FRANCESCO**, Department of Chemistry, University of Pisa, Pisa, Italy

FP-7:IL09 A Hybrid Bluetooth-based Network Architecture for Outdoor and Home-monitoring of Human Mobility Using Wearables

E. CASILARI, J.M. CANO GARCÍA et al., Universidad de Málaga, Málaga, Spain

Focused Session FA-4 / FP-8

Progress in 3D Bioprinting of Soft Tissues and Organs

(Focused Joint Session with Symposium FA)

FA-4/FP-8:IL01 Two Photon Polymerization for Biofabrication

R. NARAYAN, North Carolina State University, Raleigh, NC, USA

FA-4/FP-8:IL02 Engineering Surface Properties of 3D Printed Scaffolds to Steer and Control Cell Activity in Tissue Regeneration

L. MORONI, Maastricht University, MERLN Institute for Technology-Inspired Regenerative Medicine, Complex Tissue Regeneration Department, Maastricht, The Netherlands

FA-4/FP-8:IL03 Strategies for Bioprinting of Volumetric Tissue Constructs

M. GELINSKY, Centre for Translational Bone, Joint and Soft Tissue Research, TU Dresden, Dresden, Germany

FA-4/FP-8:IL04 Biomimetic Natural Polymer-based Bioinks for Microtissue Modelling

P. GENTILE, A. SCALZONE, R. DA CONCEICAO RIBEIRO, A.M. FERREIRA, K. DALGARNO, School of Engineering, Newcastle University, Clarendon Road, Newcastle Upon Tyne, UK

FA-4/FP-8:IL05 Engineering the Cellular Niche Via CAD/CAM Laser Processing

J. SAKSENA¹, S.C. SKLARE¹, B.T. VINSON¹, Y. HUANG², **D.B. CHRISSEY**¹, ¹Tulane University, New Orleans, LA, USA; ²University of Florida, Gainesville, FL, USA

FA-4/FP-8:IL06 Multimaterial and Multiscale Biofabrication Approach

C. DE MARIA, Research Center E. Piaggio and Dept. of Information Engineering at University of Pisa, Pisa, Italy

FA-4/FP-8:IL07 Engineering Skeletal Muscle Tissue with Innovative Biofabrication Approaches

M. COSTANTINI, Institute of Physical Chemistry - PAN, Warsaw, Poland; C. GARGIOLI, Università degli studi di Roma - Tor Vergata, Rome, Italy

FA-4/FP-8:IL08 Putting 3D Bioprinting to the Use of Tissue Model Fabrication

Y. SHRIKE ZHANG, Department of Medicine, Harvard Medical School, Cambridge, MA, USA

FA-4/FP-8:IL09 3D Bioprinted Tissue Substitutes: Recent Advances and Prospects in Healthcare

M. DOMINGOS, Department of Mechanical, Aerospace and Civil Engineering, School of Engineering, Faculty of Science and Engineering, The University of Manchester, Manchester, UK

FA-4/FP-8:IL10 Scaffold-free Bio-3D Printing for Solid organ fabrication

KOICHI NAKAYAMA, Department of Regenerative Medicine and Biomedical Engineering, Faculty of Medicine, Saga University, Saga, Japan

Poster Presentations

FA:P01 Reversible 4D Bio-inspired Structures using Sugar-Responsive Soft Polymers

D. NICDAO, L. FLOREA, The University of Dublin, Dublin, Ireland

FA:P02 Modular 4D Printing

ZIZHENG FANG, HUIJIE SONG, YUE ZHANG, BINJIE JIN, JINGJUN WU, QIAN ZHAO, TAO XIE, Zhejiang University, Hangzhou, China

FA:P03 Mechanical Property Anisotropy of Rapid Prototyping Parts Fabricated by SLA

NING MI, NANA YANG, **HAORUI LIU**, Longdong University, Qingyang, China

FB:P01 Parylene Multi-layer Barrier Film in a Single Chamber for Flexible Organic Light Emitting Diode

A. GASONOO, JAE-HYUN LEE, MIN-HOI KIM, **YOONSEUK CHOI**, Hanbat National University, Daejeon, South Korea

FB:P02 Electrical and Reliability Characteristics of Self-Forming Barrier for Advanced Copper Interconnects

YI-LUNG CHENG, CHIH-YEN LEE¹, WEI-FAN PENG, GIIN-SHAN CHEN, JAU-SHIUNG FANG, Department of Electrical Engineering, National Chi-Nan University, Nan-Tou, Taiwan; Department of Materials Science and Engineering, Feng Chia University, Taichung, Taiwan; Department of Materials Science and Engineering, National Formosa University, Huwei, Taiwan

FB:P03 Self-assembled-monolayer Activation Process for Electroless Plating of Copper Interconnects without a Conventional Barrier

GIIN-SHAN CHEN¹, TZU-MING YANG¹, YI-LUNG CHENG², JAU-SHIUNG FANG³, ¹Department of Materials Science and Engineering, Feng Chia University, Seatwen, Taichung City, Taiwan; ²Department of Electrical Engineering, National Chi-Nan University, Puli, Nantou County, Taiwan; ³Department of Materials Science and Engineering, National Formosa University, Huwei, Yunlin County, Taiwan

FB:P04 Structural and Self-forming Barrier Behaviors of Cu(Sc) Alloy Thin Film for Cu Interconnection

JAU-SHIUNG FANG¹, Y.N. LIN¹, G.S. CHEN², Y.L. CHENG³, Y.P. TSAI⁴, ¹Department of Materials Science and Engineering, National Formosa University, Huwei, Yunlin, Taiwan; ²Department of Materials Science and Engineering, Feng Chia University, Taichung, Taiwan; ³Department of Electrical Engineering, National Chi-Nan University, Puli, Nantou, Taiwan; ⁴Department of Civil Engineering, National Chi Nan University, NanTou, Taiwan

FB:P05 Double-layer Cr2O3/Al2O3 Antireflection Coatings for Colored Cu/CrAIN/Cr2O3/Al2O Solar Thermal Absorbers

TING-KAN TSAI, HAO-CHIEN CHANG, Department of Materials Science and Engineering, National Formosa University, Yunlin, Taiwan

FB:P06 Theoretical Investigations on Structural, Electronic and Mechanical Properties of RuBx (x=1, 2, 3)

ANG-YANG YU, Liaoning Technical University, Fushun, Liaoning province, China

FC:P01 Detection of Nitrate Ions using Electrochemical Sensors

B. PATELLA, R. RUSSO, G. AIELLO, **R. INGUANTA**, Laboratorio di Chimica Fisica Applicata, Dipartimento di Ingegneria, Università degli Studi di Palermo, Palermo, Italy

FC:P02 A Highly-densified Silicon Nanowire Array Using Top-down Fabrication Process

KANGIL KIM, JAE KEUN LEE, SEUNG JU HAN, DO HYUNG KIM, **SANGMIN LEE**, Department of Biomedical Engineering, Kyung Hee University, Yongin, Gyeonggi, South Korea

FC:P03 Electrochemical Detection of Paracetamol by using Synthesised of Zirconium oxide Nanoparticle Modified Carbon Paste Electrode

S. BULLAPURA MATT¹, S. MANJUNATHA², M. SHIVANNA², M. SIDLINGAPPA³, M.S. DHARMAPRAKASH², ¹Research Centre, Department of chemistry, G.M. Institute of Technology, Davangere, India; ²Department of chemistry, B M S College of Engineering, Bangalore, India; ³Department of chemistry, UBDT College of Engineering, Davangere, India

FE:P01 High Sensitive Gas Sensor of Diamond Nanocones at Room Temperature

CHANGZHI GU, Institute of Physics, CAS, Beijing, China

FE:P02 Optical properties of Mild and Strongly Oxidized Single Walled Carbon Nanotubes

R. CHINNAMBEDU MURUGESAN¹, S.A. ALEKSEEV², D.M. KORYTKO², A. ROZHIN¹, ¹Nanoscience research group, Aston Institute of Photonic Technologies, Aston University, UK; ²Faculty of Chemistry, T. Shevchenko National University of Kyiv, Ukraine

FE:P03 Co3O4/SWCNT Composite for Enhanced Methanol Sensing

NGUYEN DUC CHINH, CHUNJOONG KIM, **DOJIN KIM**, Department of Materials Science and Engineering, Chungnam National University, Daejeon, South Korea

FE:P04 Electrochemical Measurement and Numerical Analysis of Bio-conjugation between Amyloid Fibrils and Metal Ions

JOOHYUNG PARK, WONSEOK LEE, MINWOO KIM, WOONG KIM, SEONGJAE JO, WOCHANG KIM, CHIHYUN KIM, HYUNJUN PARK, JINSUNG PARK, Korea University, Sejong, South Korea

FE:P05 Red Blood Cell Membrane Functionalized Electrochemical Biosensor for Detection of Fibrinogen

JINSUNG PARK, JOOHYUNG PARK, SEONGJAE JO, WOONG KIM, MINWOO KIM, HYEONJOON PARK, WOCHANG KIM, CHIHYUN KIM, WONSEOK LEE, Department of Control and Instrumentation Engineering, Korea University, Sejong, South Korea

FF:P01 Propagation Property of Electromagnetic Waves in Coupled System of One-Dimensional Photonic Crystal

H. KITAHARA¹, Y. NAKATA², Y. SUZUKI³, J. MIYASHITA⁴, F. MIYAMARU³, **MITSUO W. TAKEDA**³, ¹Research Center for Development of Far-Infrared

Region, University of Fukui, Bunkyo, Fukui, Japan; ²Graduate School of Engineering Science, Osaka University, Toyonaka, Osaka, Japan; ³Department of Physics, Faculty of Science, Shinshu University, Matsumoto, Japan; ⁴Nagano Prefecture General Industrial Technology Center, Wakasato, Nagano, Japan

FF:P02 Mie Resonance Based Machinable Isotropic Left-handed Materials for Microwave Application

Q. CHANG, T.X. FAN, School of Material Science and Engineering, Shanghai Jiao Tong University, Shanghai, China

FG:P01 Ln3+→Ln3+ Energy Transfer Processes in Double Phosphate Eulytite Hosts

V. PATERLINI, F. PICCINELLI, **M. BETTINELLI**, Luminescent Materials Laboratory, Department of Biotechnology, University of Verona, and INSTM, UdR Verona, Verona, Italy

FG:P02 White Light Emission in Zinc Phosphate Glasses Activated with Ag Clusters and Sm3+ for W-LEDs Applications

O. SORIANO-ROMERO¹, R.L. FLORES-CRUZ², R. LOZADA-MORALES¹, U. CALDIÑO³, S. CÁRMONA-TÉLLEZ⁴, **A.N. MEZA-ROCHA**⁴, ¹Benemérita Universidad Autónoma de Puebla, Posgrado en Física Aplicada, Facultad de Ciencias Físico-Matemáticas; ²Benemérita Universidad Autónoma de Puebla, Facultad de Ciencias Físico-Matemáticas; ³Departamento de Física, Universidad Autónoma Metropolitana-Iztapalapa; ⁴CONACYT-Benemérita Universidad Autónoma de Puebla, Posgrado en Física Aplicada, Puebla, Mexico

FG:P03 Lifetime Dependence on Mn-doping in Mg7Ga2GeO12:Mn Red Phosphor

J. ST. JULIEN, D.S. LEE, Physics Department, Gordon College, Wenham, MA, USA

FG:P04 Energy Transfer Studies in Ce3+ and Mn2+ Doped Garnets towards Application in LEDs

V. ANSELM, T. JÜSTEL, Department of Chemical Engineering, Münster University of Applied Sciences, Steinfurt, Germany

FG:P05 White Light Production, from Embedded Phosphors' Blend into Polystyrene, an Upconversion Experiment

S. CARMONA TELLEZ, G. ALARCON FLORES, A.N. MEZA ROCHA, R. LOZADA MORALES, CONACYT-Benemérita Universidad Autónoma de Puebla, Facultad de Ciencias Físico-Matemáticas, Puebla, Mexico

FG:P06 Enhancement of Green, Red and NIR Photoluminescent Emissions, and Burstein Moss Effect in CdO-V2O5-P2O5: Er3+ : Yb3+ Co-doped Glass System

R. LOZADA-MORALES¹, E. CERVANTES-JUÁREZ¹, A.N. MEZA-ROCHA², S. CARMONA-TELLEZ², ¹Benemérita Universidad Autónoma de Puebla, Postgrado en Física Aplicada, Facultad de Ciencias Físico-Matemáticas, Puebla Pue., México; ²CONACYT-Benemérita Universidad Autónoma de Puebla, Postgrado en Física Aplicada, Facultad de Ciencias Físico-Matemáticas, Puebla Pue., México

FG:P07 Nanoporous Silicon Light Emitting Materials for MicroLED Displays

A. STEPANOV, V. BONDARENKO, A. SMIRNOV, B. KAZARKIN, Y. MUKHA, Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus

FG:P08 Spectroscopic Properties and Energy Transfer in Ag/Nd3+ Co-doped Zinc Phosphate Glasses

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FG:P09 Spectroscopic Properties and Energy Transfer in Ag/Yb3+ Co-doped Zinc Phosphate Glasses

W. ROMERO ROMO¹, O. SORIANO ROMERO¹, R. LOZADA MORALES¹, S. CARMONA TELLEZ², A.N. MEZA ROCHA², ¹Benemérita Universidad Autónoma de Puebla, Posgrado en Física Aplicada, Facultad de Ciencias Físico-Matemáticas, Puebla, Pue., México; ²CONACYT-BUAP, Posgrado en Física Aplicada, Puebla, Mexico

FG:P10 Photoluminescence Properties of Zn3(VO4)2 Doped with Er3+ M.Y. ESPINOSA-CERÓN¹, O. SORIANO-ROMERO¹, R. LOZADA-MORALES¹, A.N. MEZA-ROCHA², ¹Benemérita Universidad Autónoma de Puebla, Postgrado en Física Aplicada, Facultad de Ciencias Físico-Matemáticas, Puebla Pue., México; ²CONACYT-Benemérita Universidad Autónoma de Puebla, Postgrado en Física Aplicada, Facultad de Ciencias Físico-Matemáticas, Puebla Pue., México**FG:P11 Effects of Europium in High Content TeO2 Glasses**

I.V. GARCÍA-AMAYA, **Ma. E. ZAYAS**, Programa Educativo de Ingeniería en Geociencias, Universidad Estatal de Sonora, Unidad Hermosillo; Depto de Investigación en Física, Universidad de Sonora, Sonora, Mexico

FF:P01 Memristive State Equation and Equivalent Circuit Model for RRAM Devices

E. MIRANDA, M. SALUDES, J. SUÑÉ, Universitat Autònoma de Barcelona, Cerdanyola del Valles, Spain

FF:P02 Low-energy and Highly Reliable Multi-bit Performance by Fully "Erase-free" Operation in a HfO₂-based Resistive Switching Device

GUN HWAN KIM, Division of Advanced Materials, Korea Research Institute of Chemical Technology (KRICT), Daejeon, South Korea

FF:P03 Role of Tetragonal Low-temperature HfO_x Phase in Conductive Switching

N. KAISER, S. PETZOLD, T. VOGEL, E. PIROS, L. ALFF, Advanced Thin Film Technology Division, Institute of Materials Science, TU Darmstadt, Darmstadt, Germany; A. ZINTLER, R. EILHARDT, L. MOLINA-LUNA, Advanced Electron Microscopy Division, Institute of Materials Science, TU Darmstadt, Darmstadt, Germany

FF:P04 Ta₂O₅-based Resistive Switching Devices for Improved Endurance and Reliable Multi-bit Operation

MIN KYU YANG, Department of IT Convergence Engineering, Sahmyook University, Seoul, South Korea; & Intelligent Electronic Device Lab, Sahmyook University, Seoul, South Korea

FF:P05 Ruddlesden-popper Perovskite Memristors: The Effect of the Crystalline Orientation

SHUYAN SHAO, W. TALSMA, M.A. LOI, Zernike Institute for Advanced Materials, University of Groningen, The Netherlands

FF:P06 Enhancement of Spin Transport Behaviour in Pt/Ni₈₀Fe₂₀(Py)/Pt

R.G. TANGUTURI, Z. PENG, T. ZHANG, School of Materials Science and Engineering, Hubei University, Wuhan, China

FF:P07 Fabrication of Sn@Al₂O₃ Core-shell Nanoparticle Floating Gate for Nonvolatile Memory Applications Using a Silicon Oxide/Aluminum Bilayer

JONG-HWAN YOON, Department of Physics, Kangwon National University, Chuncheon, Gangwon-do, South Korea

FF:P08 Implementation of an Electrical Set-up to Enable RRAM-based Neural Network Operations

E. PEREZ-BOSCH, E. PEREZ, C.A. CHAVARIN, M.K. MAHADEVAIAH, C. WENGER, IHP-Leibniz-Institut für innovative Mikroelektronik, Frankfurt (Oder), Germany; F. ZAHARI, H. KOHLSTEDT, Nanoelectronic, Faculty of Engineering, Kiel University, Kiel, Germany; M. ZIEGLER, Department of Micro- and Nanoelectronic Systems, TU Ilmenau, Ilmenau, Germany; C. WENGER, Brandenburg medical School Theodor Fontane, Neuruppin, Germany

FF:P09 Continuum Model of Charge Transport in Dielectrics: Steady-State Analytical Solutions

A.A. CHERNOV, A.A. PIL'NIK, ITP SB RAS, Novosibirsk, Russia; D.R. ISLAMOY, ISP SB RAS, Novosibirsk, Russia

FF:P10 Continuum Model of Charge Transport in Dielectrics: Drift and Diffusion of Trapped Charge Carriers

A.A. PIL'NIK, A.A. Chernov, ITP SB RAS, Novosibirsk, Russia; D.R. ISLAMOY, ISP SB RAS, Novosibirsk, Russia

FI:P01 The Effect of the Boundary Parameters Changes on the Phonon Dispersion Law and the Thermal Properties of the Quasi 2D Crystals

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FI:P02 Effective Synthesis and Characterization of Large-scale MoS₂ Nanosheets by Chemical Vapor Deposition Methods

P.P. TUMMALA, A. LAMPERTI, C. MARTELLA, A. MOLLE, CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy; E. KOZMA, G. SCAVIA, U. GIOVANELLA, CNR-SCITEC, Milano, Italy; K. ASHOKBHAI PATEL, R. SORDAN, LNESS, Politecnico di Milano, Como, Italy; M. BOLLANI, CNR-IFN, Milano, Italy; L.G. Nobili, Politecnico di Milano, Dipartimento di Chimica, Materiali e Ingegneria Chimica, Milano, Italy

FI:P03 Two-dimensional Nanosheets by Rapid and Efficient Microwave Exfoliation of Layered Materials

WEI WU, HAN ZHOU, Tongxiang Fan State Key Lab of Metal Matrix Composites, School of Materials Science and Engineering, Shanghai Jiao Tong University, Shanghai, China

FI:P04 A New Solution-process Method for 2D MoS₂ Nano Material without CVD

WOON-SEOP CHOI, Hoseo University, Asan, South Korea

FI:P05 Studies of the Influence of P₂O₅ in Graphene-based TiO₂ Glassy Films for Photocatalytic Applications

I.C. VASILIU¹, A.M. IORDACHE¹, S. IORDACHE¹, M. ELISA¹, I. TISMANAR², A. DUTA², C. OBREJA³, O. BUIU³, R. TRUSCA⁴, ¹National Institute of Research and Development for Optoelectronics - INOE 2000, Magurele, Romania;

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FI:P06 Ultrasonic-assisted Preparation of Porous Palladium Nanobranches Supported on Reduced Graphene Oxide for Methanol Electro-oxidation

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FI:P07 One-pot Sol-gel Synthesis of Layered Double Hydroxides

D.J. POCHAPSKI, R.M.M. SANTOS, S.H. PLUCINELLI, **C.V. SANTILLI**, Chemistry Institute of the São Paulo State University - UNESP, Araraquara, São Paulo, Brazil

FI:P08 Graphenic Nanostructures Integrated in Microfluidic Chips for SERS Biosensing

G. BIASOTTO¹, F. GIORGIS², P. RIVOLLO², M.A. ZAGHETE¹, ¹LIEC, Institute of Chemistry, São Paulo State University-UNESP, Araraquara, Brazil; ²Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy

FI:P09 Improvement of the X-ray Shielding Features of PVDF/rGO Nanocomposites

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FJ:P01 Study of Ba and Mn co-doped Bismuth Ferrite (BiFeO₃) Nanoparticles (NPs)

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FJ:P02 Template-free Synthesis of Dendritic PbS@CuS Core-shell Photocatalysts for Efficient Photocatalytic Hydrogen Generation

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FJ:P03 Covalent Functionalization of Carbon Nitride Frameworks through Cross-coupling Reaction

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FJ:P04 Application of Immobilization Photocatalyst for Removal of Pollutants in Water

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FJ:P05 Eu₂O₃/ZnO-coated Bio Silica as a Novel Visible Light Photocatalyst: Preparation, Characterization and Optical Study

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FJ:P06 Sunlight Desalination Coupled with Water Treatment and Hydrogen Production Using Photoelectrochemical Reaction

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FK:P01 Polycationic Boronic Acid Homopolymers as Optical Sugar Sensors

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FK:P02 Evaluation of Conductivity with Molecular Orientation of PEDOT on a PSS Brush

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FK:P03 Layered Double Hydroxides @ Siloxane-Poly(Ethylene Oxide) Hybrid Nanocomposites for Drug Delivery

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FK:P04 Multi-stimulus-responsive Natural Nucleotide-Mediated Soft Supramolecular Hydrogels

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FL:P01 Investigation of Martensitic Transformation Characteristics, Thermal Hysteresis, and Magnetocaloric Effect in Ti Doped Ni-Co-Mn-In Heusler Alloy

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FL:P02 Large Caloric Effects in Low Hysteresis Ni-Mn-Ga-Cu Ferromagnetic Shape Memory Alloy

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FL:P03 Static and Dynamic Characterization of Flexinol Wires in a Biomimetic Perspective

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FL:P04 Effect of Hysteresis on the Magnetocaloric Properties of Nd doped NiCoMnIn Magnetic Shape Memory Alloy

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FM:P01 Novel Electrospun Hybrid Pressure Sensor based on Polyurethane-polyvinylidene Fluoride Blend

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FM:P02 Electronic Textile Based Wearable Electrotherapy for Joint Pain Relief

MEIJING LIU, M. GLANC-GOSTKIEWICZ, S. BEEBY, K. YANG, Smart Electronic Materials and Systems, University of Southampton, Southampton, UK

FM:P03 Flexible and Wearable Photodiodes made on Fabrics for Smart Fashion

WONJAE LEE, A. RAHIM, S. SINGH, J. LEE, School of Advanced Materials Engineering, Kookmin University, Seoul, South Korea

FM:P04 Hybrid Corona-dielectric Barrier Discharge for Permethrin Polymerization on Polyamide Fabric at Atmospheric Pressure

A. PETRACONI¹, A.H.R. CASTRO¹, F. GASI², E. BITTENCOURT¹, L. NASCIMENTO¹, G. PETRACONI¹, F.S. MIRANDA¹, G. VALADARES³, M. DUARTE³, A.S.S. SOBRINO¹, M. MASSI⁴, H.S. MACIEL¹, ¹ITA-Instituto Tecnológico de Aeronáutica, LPP, S.J. Campos, SP, Brazil; ²UFABC-Universidade Federal do ABC, SP, Brazil; ³Ipanema, SP, Brazil; ⁴Universidade Mackenzie, SP, Brazil

FP:P01 Fabricating Novel Glass via Containerless Processing for Biologic Applications

QIN LI, JIANDING YU, JIANG CHANG, Shanghai Institute of Ceramics, CAS, Shanghai, China

FP:P02 New Biodegradable Poly(ester amide)s Made of Unsaturated Non-proteinogenic α -amino Acids

D. TUGUSHI, N. KUPATADZE, TEM. KANTARIA, N.ZAVRADASHVILI, M. GVERDTSITELI, R. KATSARAVA, Institute of Chemistry and Molecular Engineering, Agricultural University of Georgia, Tbilisi, Georgia; A. SAGHYAN, A. MKRTCHYAN, A.S. POGHOSYAN, Institute of Pharmacy, Yerevan State University, Republic of Armenia

FP:P03 Electrochemical and Corrosion Properties of TiN Coatings on Stainless Steel and Titanium Nickelide Substrates

V.V. RUBANIK, D.A. BAHRETS, O.A. PETROVA-BURKINA, A.D. SHILIN, Y.V. NIKIFARAVA, Institute of Technical Acoustics of the National Academy of Sciences of Belarus, Vitebsk, Belarus; D.E.L. VIEIRA, A.N. SALAK, Department of Materials and Ceramic Engineering, CICECO-Aveiro Institute of Materials, University of Aveiro, Aveiro, Portugal

FP:P04 Preparation and Characterization of Inhalable Nano-in-microparticles for Antimicrobial Photodynamic Therapy

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FP:P05 Spray Drying for the Preparation of Innovative Antibacterial Nanocoatings for Medical Implants

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FP:P06 Surface Modified Nanoparticles for Real-time Imaging of Circulating Tumor Cells

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FP:P07 Ag3PO4 Exhibits Antibacterial Activity against Staphylococcus Aureus "Superbug"

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