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 **Brain-inspired Materials, Devices, and Circuits for Intelligent Systems**
YONG CHEN, University of California, Los Angeles, CA, USA

F:PL3 **Development of Conceptually New AIEgens for Biomedical Theranostics**
BEN ZHONG TANG, Department of Chemistry, The Hong Kong University of Science & Technology, Clear Water Bay, Kowloon, Hong Kong, China

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 **Direct Ceramic Fabrication by Lithographic Additive Manufacturing for Energy Harvesting**
SOSHU KIRIHARA, Osaka University, Ibaraki City, Osaka, Japan

FA-1:IL02 **3D Printing of Hierarchical Porous Ceramics**
A.R. STUDART, ETH Zurich, Switzerland

FA-1:IL03 **Multimaterial 3D Printing of Functional Ceramics for Energy Applications**
M. TORRELL[1], A. PESCE[1], M. NUÑEZ[1], N. KOSTRETSOVA[1], A. MORATA[1], **A. TARANCÓN**[1, 2], [1]Catalonia Institute for Energy Research, Sant Adrià de Besòs, Barcelona, Spain; [2]ICREA, Barcelona, Spain

FA-1:IL04 **How can we Achieve High-strength and Tough 3D-printed Ceramics with Quite Simple Mechanistic Approaches?**
J. CHEVALIER[1], H. REVERON[1], M. SAADAOUI[2], M. MAILLARD[1], L. GREMILLARD[1], F. ZHANG[3], V. GARNIER[1], E. CAMPOSILVAN[4], J. ADRIEN[1], [1]Université de Lyon, INSA de Lyon, MATEIS CNRS UMR5510, Villeurbanne Cedex, France; [2]Université Mohamed V de Rabat, EMI, LERSIM, Rabat, Morocco; [3]KU Leuven (University of Leuven) and UZ Leuven (University Hospitals Leuven), Leuven, Belgium; [4]Mathym, Champagne-au-Mont-d'Or, France

FA-1:IL05 **Quality Aspects with Regard to 3D Printing of Ceramics**
F. RAETHER, J. VOGT, Fraunhofer Zentrum für Hochtemperatur-Leichtbau HTL, Bayreuth, Germany

FA-1:IL06 **Additive Manufacturing of Ceramics and Ceramic Composites for Aerospace Applications**
J.J. BOWEN[1, 2], L.M. RUESCHHOFF[1], K.L. MARTIN[1, 2], D.P. STREET[1, 3], M.J.S. PARVELESCU[1, 2], **M.B. DICKERSON**[1], [1]Materials and Manufacturing Directorate, Air Force Research Laboratory, Wright-Patterson AFB, OH, USA; [2]UES Inc., Dayton, OH, USA; [3]NRC Research Associateship Programs, Washington, DC, USA

FA-1:IL07 **Additive Manufacturing and Properties of Silica Ceramic Cores**
JIA-MIN WU[1, 2], WEN ZHENG[1, 2], JIE ZHANG[1, 2], KANG-BO YU[1, 2], YU-SHENG SHI[1, 2]; [1]State Key Laboratory of Materials Processing and Die &Mould Technology, School of Materials Science and Engineering, Huazhong University of Science and Technology, Wuhan, China; [2]Engineering Research Center of Ceramic Materials for Additive Manufacturing, Ministry of Education, Wuhan, China

FA-1:IL08 **Innovative Zirconia-based Material Shaped by SLA 3D Printing**
C. CHAPUT, C. SCHICK, 3DCERAM-SINTO, Bonnac La Cote, France

FA-1:IL09 **Clinical Significance of 3D Printing in Bone Disorder**
S. BOSE, PH.D. HERMAN, B. LINDHOLM, School of Mechanical and Materials Engineering, Department of Chemistry, Elson Floyd College of Medicine, Washington State University, Pullman, WA, USA

FA-1:IL10 **Stereolithography of Ceramic Components using Binary Materials**
HUI-SUK YUN, Korea Institute of Materials Science, Changwon, South Korea

FA-1:IL11 **Integrated Design and 3D Printing of Porous Ceramics**
ZHANGWEI CHEN, Additive Manufacturing Institute, Shenzhen University, China

FA-1:IL12 **A Segregation Model Study of Suspension-based Additive Manufacturing**
CHANG-JUN BAE[1], J.W. Halloran[2], [1]3D Printing Materials Center, Korea Institute of Materials Science (KIMS), Changwon, South Korea; [2]Dept. of Materials Science and Engineering, University of Michigan, Ann Arbor, USA

FA-1:L13 **A Guide for Selecting Dispersants for Ceramic Filled Resins for Stereolithography**
W. YARED, University of Stuttgart, GSaME, Graduate School of Excellence advanced Manufacturing Engineering, Stuttgart, Germany

FA-1:L14 **Eutectic Ceramic Microstructures using Laser Powder Bed Fusion (L-PBF)**
J.E. MARTINEZ DOSAL, C. COLIN, M.H. BERGER, MINES Paris, PSL, Centre de Matériaux, UMR CNRS 7633, Evry, France

FA-1:IL15 **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

Session FA-2

Additive manufacturing of polymeric, metallic and multi-material structures

FA-2:IL01 **Additive Manufacturing of Multi-material Structures**
A. BANDYOPADHYAY, School of Mechanical and Materials Engineering, Washington State University, Pullman, WA, USA

FA-2:IL02 **Multimaterial Components by Additive Manufacturing Technologies**
T. MORITZ, S. WEINGARTEN, J. ABEL, E. SCHWARZER, U. SCHEITHAUER, A. GÜNTHER, J. SCHILM, K. WÄTZIG, Fraunhofer Institute for Ceramic Technologies and Systems, Dresden, Germany

FA-2:IL03 **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:IL04 **Nanoparticle Additivation of Polymer Powders for Powder Bed Fusion of Parts with Novel Optical and Magnetic Properties**
C. DONATE-BUENDIA, B. GÖKCE, Materials Science and Additive Manufacturing, University of Wuppertal, Wuppertal, Germany

FA-2:L05 **Two-photon Polymerisation of 3D PEDOT:PSS Composite Microstructures**
J.M. DELENTE, S. KOLAGATLA, L. FLOREA, School of Chemistry & AMBER, The SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, Dublin 2, Ireland; N. LÓPEZ-LARREA, M. CRIADO-GONZALEZ, D. MECERREYES, POLYMAT University of the Basque Country UPV/EHU, Donostia-San Sebastián, Spain

FA-2:L06 **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:L07 **Inconel-steel Multilayers by Liquid Dispersed Metal Powder Bed Fusion: Microstructure, Residual Stress and Property Gradients**
J. KECKES, **S.C. BODNER**, J. ZALESAK, J. TODT, J.F. KECKES, V. MAIER-KIENER, 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; S. MIRZAEI, Central European Institute of Technology CEITEC, Brno, Czech Republic

FA-2:IL08 **Two-color Irradiation for Volumetric Photopolymerization Confinement**
T.F. SCOTT[1,2], H.L. VAN DER LAAN[3], MARK A. BURNS[4,5], [1]Department of Chemical Engineering, Monash University, Clayton, VIC, Australia; [2]Department of Materials Science and Engineering, Monash University, Clayton, VIC, Australia; [3]Macromolecular Science and Engineering Program, University of Michigan, Ann Arbor, MI, USA; [4]Department of Chemical Engineering, University of Michigan, Ann Arbor, MI, USA; [5]Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI, USA

FA-2:IL09 **Selection of Microstructure under Extreme Solidification Conditions in Powder Bed Fusion type Additive Manufacturing of Metals**
YUICHIRO KOIZUMI, M. OKUGAWA, T. MAEDA, H. YOSHIMA, Y. MIYATA, N. KAZUFUMI, T. NAKANO, Osaka University, Suita, Osaka, Japan

FA-2:IL10 **Microstructure Control of Metals via Additive Manufacturing Processes**
M. SEITA, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

FA-2:L11 **Control of Density and Grain Structure of Laser Powder Bed-fused Nickel, Iron, Titanium and Aluminum Alloys: Simulation-driven Process Mapping**
V. BRAILOVSKI, Ecole de Technologie Superieure, Montreal, Canada

FA-2:IL12 **Multi- Material / Modality / Scale / Axis: Realizing Multi-Functional Products with Next-Generation AM Processes**
C.B. WILLIAMS, Virginia Tech, Blacksburg, VA, USA

FA-2:IL13 **High-strength and Programmable Meta-crystals**
MINH-SON PHAM, Imperial College London, London, UK

FA-2:IL14 **Additive Manufacturing of Architected Composites with Exceptional Energy Absorption**
L. VALDEVIT, J. BAUER, M. SALA CASANOVAS, University of California, Irvine, Irvine, CA, USA

FA-2:IL15 **Towards Additive Manufacturing of Novel Aluminum-based Self-healing Metal Matrix Composites by Directed Energy Deposition (DED)**
N. ELIAZ, D. SVETLIZKY, Department of Materials Science and Engineering, Tel-Aviv University, Ramat Aviv, Tel Aviv, Israel; B. ZHENG, S. JIANG, Y. ZHOU, L. VALDEVIT, J.M. SCHOENUNG, Department of Materials Science and Engineering, University of California at Irvine, CA, USA; E.J. LAVERNIA, US National Academy of Engineering, Irvine, CA, USA

FA-2:L16 **Numerical Analysis and Characterization of a 3D Printed Metallic Load Frame**
M. HAMID, KH. MCMILLAN, A.R. TIANO, K. OLSON, J. UTTER, J. TOROK, IBM, Rochester, MN, USA

FA-2:L17 **Mechanical Properties of a Case-hardened Low-alloyed Steel produced by PBF-LB**
K. KUTLEŠA, S.C. BODNER, J. KECKES, Montanuniversität Leoben, Leoben, Austria

Session FA-3
4D Printing

FA-3:IL01 **Moving 4D Printed Active Polymer Structures**
G. SCALET, Department of Civil Engineering and Architecture, University of Pavia - Italian Interuniversity Consortium on Materials Science and Technology (INSTM), Pavia, Italy

FA-3:L02 **4D Sugar Responsive Microstructures Fabricated via Two Photon Polymerisation**
A. ENNIS, D. NICADO, C. DELANEY, L. FLOREA, School of Chemistry & AMBER, the SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, the University of Dublin, College Green, Dublin, Ireland

FA-3:L03 **Cyclic Ketene Acetals as Additives for the Formulation of Subtractive Manufacturing Resists: Properties and Applications**
M. CARLOTTI, O. TRICINCI, V. MATTOLI, Center for Materials Interfaces, Italian Institute of Technology, Pontedera, Italy

FA-3:IL04 **Multiscale 3D Printing of Active Electronics and Ingestible Devices**
YONG LIN KONG, Department of Mechanical Engineering, University of Utah, Salt Lake City, UT, USA

FA-3:IL05 **3D Printing of Functional Architectures built from Two-dimensional Materials**
S. BARG, University of Manchester, Manchester, UK

Session FA-4
Applications of additive manufacturing technologies

FA-4:IL01 **Additive Manufacturing - Recent Developments and Future Challenges**
D.L. BOURELL, The University of Texas at Austin, Austin, TX, USA

FA-4:L02 **Integration of 3D Laser Lithography and Micro-contact Printing for Bioinspired Surfaces with Advanced Wettability**
O. TRICINCI, F. PIGNATELLI, V. MATTOLI, Center for Materials Interfaces, Istituto Italiano di Tecnologia, Pontedera (PI), Italy

Focused Session FA-5 / FQ-8
3D Bioprinting of Soft Tissues and Organs
(Focused Joint Session with Conference FQ)

FA-5/FQ-8:IL01 **Two Photon Polymerization for Biofabrication**
R. NARAYAN, North Carolina State University, Raleigh, NC, USA

FA-5/FQ-8:IL02 **Biofabrication: From Additive Manufacturing to Bioprinting and Bioassembly for Regenerative Medicine Applications**
L. MORONI, Maastricht University, MERLN Institute for Technology-Inspired Regenerative Medicine, Complex Tissue Regeneration Department, Maastricht, The Netherlands

FA-5/FQ-8:IL03 **Putting 3D Bioprinting to the Use of Tissue Model Fabrication**
Y. SHRIKE ZHANG, Division of Engineering in Medicine, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Cambridge, MA, USA

FA-5/FQ-8:IL04 **Multimaterial and Multiscale Biofabrication Approach**
C. DE MARIA, Research Center E. Piaggio and Dept. of Information Engineering at University of Pisa, Pisa, Italy

FA-5/FQ-8:IL05 **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

FA-5/FQ-8:IL06 **Biofabricating Murine and Human Myo-substitutes for Rapid Volumetric Muscle Loss Restoration**
M. COSTANTINI, Institute of Physical Chemistry - PAS, Warsaw, Poland; C. GARGIOLI, Università degli studi di Roma - Tor Vergata, Rome, Italy

FA-5/FQ-8:L07 **Nano-encapsulation of Stem Cell-derived β-cell Aggregates using 3D Bioprinting System**
YEONGGWON JO, D.G. HWANG, M. KIM, S. CHO, J. JANG, Pohang University of Science and Technology (POSTECH), Pohang, Gyeongbuk, South Korea

FA-5/FQ-8:L08 **Modular Assembly of 3D Bioprinted Engineered Heart Tissue to Reconstruct Contractile Direction to Mimic Myocardial Fiber Orientation**
DONG GYU HWANG, U. YONG, H. CHOI, J. JANG, POSTECH, Pohang, Gyeongbuk, South Korea

FA-5/FQ-8:IL09 **Strategies for Bioprinting of Volumetric Tissue Constructs**
M. GELINSKY, Centre for Translational Bone, Joint and Soft Tissue Research, TU Dresden, Dresden, Germany

FA-5/FQ-8:IL10 **Organ-on-chip Technology for the Study of Neuro-degenerative Disorders**
A. POLINI, CNR Nanotec, Lecce, Italy

FA-5/FQ-8:IL11 **3D in Vitro Model of the Microbiota-gut-bone Axys**
G. VOZZI, F. BIAGINI, F. MONTEMURRO, C. DE MARIA, Research Center "E. Piaggio" and Department of Information Engineering, University of Pisa, Pisa, Italy; M. CALVIGIONI, E. GHELARDI, Research and New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy; G. CERQUENI, S. MARCHI, M. MATTIOLI-BELMONTE, DISCLIMO, Università Politecnica delle Marche, Ancona Italy.

FA-5/FQ-8:L12 **A Biohybrid 3D-printed Tissue-sensor Platform for Continuous Monitoring of Cardiac Muscle Contractions**
UIJUNG YONG[1], D. KIM[1], H. KIM[2], D. G. HWANG[1], S. CHO[1], H. NAM[1], S. KIM[1], T. Y. KIM[1], U. JEONG[1], K. KIM[1], W. K. CHUNG[1], W.H. YEO[2], J. JANG[1], [1]POSTECH, Pohang, Gyeongsangbuk-do, South Korea; [2]Georgia Institute of Technology, Atlanta, GA, USA

FA-5/FQ-8:L13 **3D Bioprinting of Human Islet-like Cellular Aggregates-Vascular Platform for Modeling Diabetes**
MYUNGJI KIM, S. CHO, D.G. HWANG, J. JANG, POSTECH, Pohang, Gyeongbuk, South Korea

FA-5/FQ-8:IL14 **Engineering the Cellular Niche Via CAD/CAM Laser Processing**
J. SAKSENA[1], S.C. SKLARE[1], B.T. VINSON[1], Y. HUANG[2], **D.B. CHRISEY**[1], [1]Tulane University, New Orleans, LA, USA; [2]University of Florida, Gainesville, FL, USA

FA-5/FQ-8:IL15 **Implantable Bioprinted Devices for Vascularisation Studies**
B. DERBY, Department of Materials, University of Manchester, Manchester, UK

FA-5/FQ-8:IL16 **3D Bioprinted Models in Human Organogenesis and Disease**
M. DOMINGOS, Department of Mechanical, Aerospace and Civil Engineering, School of Engineering, Faculty of Science and Engineering & The Henry Royce Institute,The University of Manchester, Manchester, UK

FA-5/FQ-8:IL17 **Toward in vitro Tissue Modeling using Bioprinting Technology**
JINAH JANG, POSTECH, Pohang, Gyeongbuk, South Korea

SYMPOSIUM FB
FLEXIBLE AND STRETCHABLE ELECTRONICS: MATERIALS, DEVICES AND APPLICATIONS

Session FB-1
Materials and fabrication processes

FB-1:IL01 **Flexible and Stretchable Organic Electronics**
QIBING PEI, University of California at Los Angeles, Los Angeles, CA, USA

FB-1:IL02 **New Inks for 2D, 3D and 4D Eelectronics**
S. MAGDASSI, Institute of Chemistry, The Hebrew University of Jerusalem, Jerusalem, Israel

FB-1:IL03 **Hybrid Perovskite Solar Cells: A Game Changer for near future Photovoltaics**
G. GRANCINI, University of Pavia, Department of Chemistry, Pavia, Italy

FB-1:IL04 **Designing Biointegrated Polymer Electronics and Biocomposites**
J. RIVNAY, Northwestern University, Chicago, USA

FB-1:L05 **Laser Enhancement of Pristine PEDOT:PSS Conductivity and Applications in Organic Electronics**
J. TROUGHTON[1], J. RODRIGUEZ-PEREIRA[2], N. PEILLON[1], J. MACAK[2], T. DJENIZIAN[1, 3], M. RAMUZ[1], [1]Ecole des Mines de Sainte Etienne, Gardanne, France; [2]Center of Materials and Nanotechnologies, University of Pardubice, Pardubice, Czechia, [3]Center of Physical-Chemical Methods of Research and Analysis, Al-Farabi Kazakh National University, Almaty, Kazakhstan

FB-1:L06 **High Resolution Transfer Lithography for Conformable Circuits on Developable High-curvature Surfaces**
I. CESINI, A. OTTOMANIELLO, M. CARLOTTI, V. MATTOLI, Center for Materials Interfaces, Istituto Italiano di Tecnologia, Pontedera, Italy

FB-1:IL07 **Electrodes by Selective Laser Sintering**
M. HAUKKA, University of Jyväskylä, Department of Chemistry, Jyväskylä, Finland

FB-1:L08 **Benefits and Challenges Associated to Oxide Coating of Metallic Nanowire Networks**
C. SANCHEZ[1, 2], A. SEKKAT[1], M. AKBARI[1], C. CRIVELLO[1], D.T. PAPANASTSAIOU[1], L. BARDET[1], C. JIMÉNEZ[1], D. BELLET[1], D. MUÑOZ-ROJAS[1], [1]Univ. Grenoble Alpes, LMGP, CNRS, Grenoble INP, Grenoble, France; [2]Univ. Grenoble Alpes, CNRS, Grenoble INP, CERAG, Grenoble, France

FB-1:L09 **3D Printed Soft Organic Thermoelectric Generators**
H.E. BAYSAL, F. MOLINA-LOPEZ, KU Leuven, Leuven, Belgium

FB-1:L10 **Efficient and Stable Transparent Electrodes based on Silver Nanowire Networks**
L. BARDET[1, 2], M. AKBARI[1], C. CRIVELLO[1], L. RAPENNE[1] , H. ROUSSEL[1], M. WEBER[1], C. JIMÉNEZ[1], D. MUÑOZ-ROJAS[1], A. DENNEULIN[2], D. BELLET[1], [1]Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; [2]Univ. Grenoble Alpes, CNRS, Grenoble INP, LGP2, Grenoble, France

FB-1:IL11 **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:IL12 **High-detectivity Wearable Organic Photodetectors Processed from Green Solvent for Self-powered Pulse Rate and Oximetry Measurements**
THUC-QUYEN NGUYEN, Center for Polymers and Organic Solids, University of California Santa Barbara (UCSB), Santa Barbara, CA, USA

FB-1:L13 **Plasmonic ITO Nanoparticles' Ink for IR Thermo-enabled Applications on Flexible Substrates**
A. MAZZOTTA, M. CARLOTTI, A. OTTOMANIELLO, V. MATTOLI, Center for Materials Interfaces, Italian Institute of Technology, Pontedera, Italy; A. GABBANI, M. RUGGERI, E. FANTECHI, F. PINEIDER, A. PUCCI, Department of Chemistry, University of Pisa, Pisa, Italy

FB-1:IL14 **Flexible Organic and Perovskite Optoelectronics fabricated via Roll-to-Roll Printing Process**
JUNLIANG YANG, Central South University, Changsha, China

FB-1:L15 **Solution-processed CuI for p-type Transparent Electronics**
KYUNGHAN AHN[1], AO LIU[2], YONG-YOUNG NOH[2], **MYUNG-GIL KIM**[1], [1]School of Advanced Materials Science & Engineering, Sungkyunkwan University, Suwon, South Korea; [2]Dept. of Chemical Engineering, Pohang University of Science and Technology (POSTECH), Pohang, South Korea

FB-1:L16 **Easy Fabrication of Stretchable Waveguide for E-skin Applications**
L. FLIEGANS, M. RAMUZ, S. BLAYAC, École des Mines de Saint-Étienne, Campus Georges Charpak Provence, Gardanne, France

FB-1:L17 **Fabrication of Inkjet Printed Tunable BST/P(VDF-TrFE) Dielectrics for Flexible Varactors**
T.P. MACH, J.R. BINDER, Institute for Applied Materials (IAM-ESS), Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany

Session FB-2
Device physics, mechanics and design

FB-2:L01 **Study in Operando of Organic Semiconductor Stretchability**
V. LAFARGE, C. SERBUTOVIEZ, M. BENWADIH, A. REVAUX, Univ. Grenoble Alpes, CEA, Liten, DTNM, Grenoble, France

FB-2:L02 **Finite Element Models of Soft Energy Harvesters based on Piezoelectric Polymers**
R. DENZER, Division of Solid Mechanics, Lund University, Lund, Sweden

FB-2:L03 **Electro-mechanical Behaviour of Semiconducting Nanonets**
S. SHARMA[1], F. MORISOT[1], T. ARJMAND[1], M. BRACCINI[1], F. VOLPI[2], C. TERNON[1], [1]Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; [2]Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP, Grenoble, France

Session FB-3
Applications of flexible/stretchable electronics

FB-3:IL01 **Printed Polymer Field-effect Transistors Operating at Radio-Frequencies**
M. CAIRONI, Center for Nano Science and Technology @PoliMi, Istituto Italiano di Tecnologia, Milano, Italy

FB-3:IL02 **Soft Neuromorphic Computing**
M.J. MIRSHOJAEIAN HOSSEINI[1], YI YANG[1], E. DONATI[2], T. YOKOTA[3], S. LEE[3]; G. INDIVERI[2], T. SOMEYA[3], **R.A. NAWROCKI**[1], [1]School of Engineering Technology, Purdue University, West Lafayette, IN, USA; [2]Institute of Neuroinformatics, University of Zurich and ETH Zurich, Zurich, Switzerland; [3]Department of Electrical and Electronics Engineering, The University of Tokyo, Tokyo, Japan

FB-3:IL03 **Silver Nanowire Networks for Stretchable Energy Harvesters: Properties and Challenges**
D.T. PAPANASTASIOU[1], S.E. HAIM[2], **A. SYLVESTRE**[2], S. BASROUR[3], D. BELLET[1], [1]Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; [2]Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; [3]Univ. Grenoble Alpes, CNRS, Grenoble INP, TIMA, Grenoble, France

FB-3:IL04 **Organic Neuromorphic Electronics and Biohybrid Systems**
Y. VAN DE BURGT, Eindhoven University of Technology, Eindhoven, Netherlands

FB-3:IL05 **Integrated Flexible Electronics and System-engineered Microrobotics**
O.G. SCHMIDT, Center for Materials, Architectures and Integration of Nanomembranes (MAIN), TU Chemnitz, Germany School of Science, TU Dresden, Germany

FB-3:L06 **Development and Application of SWCNT Spray and Sheets**
SEIKI CHIBA, Chiba Science Institute, CEO, Tokyo, Japan; M. WAKI, CEO, Wits Inc., Tochigi, Japan; M. TAKESHITA, M. UEJIMA, CNT Lab., Zeon Corporation, Kawasaki, Japan

FB-3:IL07 **Direct Assembly of Micro LEDs and their Thermal Management for Stretchable Display**
JU SEUNG LEE, HAELEEN HONG, **TAE-IL KIM**, School of Chemical Engineering, Sungkyunkwan University, Suwon, South Korea

FB-3:IL08 **Design Challenges toward Flexible E-Textiles Systems**
J.S. JUR, A.C. MILLS, I. KIM, B. LI, Z. ROSENBERG, E. COBARRUBIAS, C. KNOWLES, B. JU, Y. ZHOU, B. SENNIK, O. TURSCHAK, I. HINES, NC State University, Wilson College of Textiles, Department of Textile Engineering, Chemistry and Science, Raleigh, NC, USA

FB-3:IL09 **Flexible and Printed Sensors and Biosensors: From Materials and Processes to Systems and Applications**
L. PETTI, P. LUGLI, Free University of Bozen, Bolzano, Italy

FB-3:IL10 **Biomaterial Lasers for Sensing and Imaging**
M. HUMAR, J. Stefan Institute, Ljubljana, Slovenia; Faculty of Mathematics and Physics, University of Ljubljana, Ljubljana, Slovenia; CENN Nanocenter, Ljubljana, Slovenia

FB-3:IL11 **Flexible and Reliable Organic Solar Cell**
KENJIRO FUKUDA[1], T. SOMEYA[1,2], [1]RIKEN, Saitama, Japan; [2]The University of Tokyo, Japan

FB-3:IL12 **Computational and Physical Optical Models of the Eye for Medical Applications**
M. RAMUZ, S. REGAL, Flexible Electronics Department, Mines St Etienne, Gardanne, France

FB-3:IL13 **Wireless Epidermal Electronic System to Simultaneously Measure Electrocardiograms and Seismocardiograms from Human Body**
M.E. HESAR, N. SEYEDSADRKHANI, D. KHAN, **S. INGEBRANDT**, Institute of Materials in Electrical Engineering 1, RWTH Aachen University, Aachen, Germany

FB-3:IL14 **Thermoelectric-based Adjustable Wearable Camouflage Devices**
SUNMI SHIN, Department of Mechanical Engineering, National University of Singapore, Singapore

SYMPOSIUM FC
RESEARCH ADVANCES ON MICRO/NANO SYSTEMS AND THEIR APPLICATIONS

Keynote Lectures

FC:KL1 **Plasma Nanotechnology for New Materials and Devices**
K. OSTRIKOV, Queensland University of Technology, Brisbane, Australia

FC:KL2 **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

FC:KL3 **(Porous) Silicon NanoPhotonics: Applications, Opportunities and Challenges**
G. BARILLARO, Dipartimento di Ingegneria dell'Informazione, Università di Pisa, Pisa, Italy

Session FC-1
Physical MEMS/NEMS; MOEMS/NOEMS

FC-1:IL01 **MEMS Cantilever Sensors**
M. FAHRBACH, J. XU, **E. PEINER**, Technische Universität Braunschweig, Institute of Semiconductor Technology (IHT), and Laboratory for Emerging Nanometrology (LENA), Braunschweig, Germany

FC-1:IL02 **3D-printing and Wet-metallization for Sensors: a Coriolis Mass Flowmeter Operating in the Mode-split Conditions**
V. ZEGA[1], L. GAFFURI PAGANI[2], M. INVERNIZZI[3], C. CREDI[3], R. SURIANO[3], R. BERNASCONI[3], P. CARULLI[2], A. FRANGI[1], M. LEVI[3], L. MAGAGNIN[3], G. LANGFELDER[2], A. CORIGLIANO[1], [1]DICA, Politecnico di Milano; [2]DEIB, Politecnico di Milano; [3]CMIC, Politecnico di Milano, Milano, Italy

FC-1:IL03 **Multifunctional Platforms on Paper**
R. MARTINS[1,2], D. GASPAR[2], I.M. MENDES[1], A.C. MARQUES[1], A. PIMENTEL[1], D. NUNES[1], L. PEREIRA[1,2], E. FORTUNATO[1,2], [1]i3N/CENIMAT, Department of Materials Science, Faculty of Science and Technology, Universidade NOVA de Lisboa and CEMOP/UNINOVA, Caparica, Portugal; [2]AlmaScience, Caparica, Portugal

FC-1:IL04 **Tuneable Opto-NEMS Resonators**
U. EMRE ALI[1], G. MODI[2], R. AGARWAL[2], **H. BHASKARAN**[1], [1]University of Oxford, Oxford, UK; [2]University of Pennsylvania, USA

FC-1:IL05 **MEMS and Microsystems for Space Applications**
M. RAIS-ZADEH, NASA Jet Propulsion Laboratory, California Institute of Technology Pasadena, CA, USA

FC-1:IL06 **Non-silicon 3D Integrated Surface Micromachining for Near-zero-power and Flexible MEMS Devices Applications**
ZHUOQING YANG, Shanghai Jiao Tong University (SJTU), Shanghai, China

Session FC-2

Chemical micro/nano-sensors and systems; Bio-MEMS/NEMS; microfluidics, lab-on-a-chip

FC-2:IL01 **Integration of Colloidal Nanocrystals in Functional Superstructures: Emerging Opportunities for Micro- and Nanofabrication**
M.L. CURRI, Dipartimento di Chimica, Università degli Studi di Bari Aldo Moro, Bari, Italy

FC-2:IL02 **Monolithic Silicon Carbide Intracortical Neural Interfaces for Long-term Human Implantation**
C. FREWIN[1], M. BEYGI[2], E. BERNARDIN[2], C. FENG[2, 3], F. LA VIA[4], W. DOMINGUEZ-VIQUEIRA[5], **S.E. SADDOW**[2, 6], [1]NeuroNexus, LLC, Ann Arbor, MI, USA; [2]Dept. of Electrical Engineering, University of South Florida, Tampa, FL, USA; [3]Dept. of Mechanical Engineering, University of South Florida, Tampa, FL, USA; [4]IMM-CNR, Catania, Sicily, Italy; [5]Moffitt Cancer Center, Tampa, FL, USA; [6]Dept. of Medical Engineering, University of South Florida, Tampa, FL, USA

FC-2:IL03 **Rapid Protein and Cell Assay System by Polymeric Microfiber Membrane**
MADOKA TAKAI, The University of Tokyo, Tokyo, Japan

FC-2:IL04 **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:IL05 **Nanofluidics: A New Arena for Materials Science**
YAN XU, Department of Chemical Engineering, Graduate School of Engineering, Osaka Prefecture University, Japan; Japan Science and Technology Agency (JST), PRESTO, Japan NanoSquare Research Institute, Osaka Prefecture University, Japan

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:L02 **Systematization of Magnetic Structures in Magnetistrictive Microwires for Sensor Application**
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 Bialystok, Bialystok, Poland; P. GAWRONSKI, AGH Univ. of Science and Technology, Faculty of Physics and Applied Computer Science, Krakow, Poland

FC-3:IL03 **On-site Energy using Piezoelectric Thin Films**
HIROKI KUWANO, Tohoku University, Sendai, Japan

FC-3:L04 **Handling of Direct Laser Written Micro-structures via Ultrathin Films for Controlled Placement on Complex Surfaces**
A. OTTOMANIELLO, M. CARLOTTI, O. TRICINCI, **V. MATTOLI**, Center for Materials Interfaces, Istituto Italiano di Tecnologia, Pontedera, Italy; F. VAN DEN HOED, P. RAFFA, Department of Chemical Engineering - Product Technology, University of Groningen, Groningen, The Netherlands

Session FC-4

Radio frequency MEMS, energy harvesting and power supply MEMS

FC-4:IL01 **Metamaterials Based RF Microsystems for Telecommunication Applications**
R. MARCELLI, E. PROIETTI, G.M. SARDI, G. CAPOCCIA, CNR-IMM, Roma, Italy; G. BARTOLUCCI, University of Roma "Tor Vergata", Roma, Italy

FC-4:IL02 **Electrical Measurements & Instruments using Weakly Coupled Micromechanical Resonators**
HONGLONG CHANG, Northwestern Polytechnical University, Xi'an, China

FC-4:IL03 **Deposition of Piezoelectric PZT Thin Films on a Variety of Substrates**
ISAKU KANNO, Kobe University, Kobe, Japan

SYMPOSIUM FD

RECENT ACHIEVEMENTS IN MULTIFERROIC AND MAGNETOELECTRIC MATERIALS

Session FD-1

Advances in materials synthesis and processing

FD-1:IL01 **Multiferroics and High Pressure, a Never Ending Story**
D. DELMONTE, E. GILIOLI, Institute of Materials for Electronics and Magnetism (IMEM), CNR, Parma, Italy

FD-1:IL02 **Preparation of Single Crystalline BiFeO3 Thin Films and their Electronic and Atomic Structures Studied by Synchrotron Radiation**
SEIJI NAKASHIMA, H. FUJISAWA, University of Hyogo, Himeji, Japan; T. Higuchi, Tokyo University of Science, Tokyo, Japan; N. HAPPO, Hiroshima City University, Hiroshima, Japan; A. YASUI, T. KINOSHITA, Japan Synchrotron Radiation Research Institute, Hyogo, Japan; Y. YAMAMOTO, R. MATSUMOTO, K. KIMURA, K. HAYASHI, Nagoya Institute of Technology, Nagoya, Japan

FD-1:L03 **HP/HT Synthesis and Characterization of Bi2CuMnO6, a RT Longe-range Ordered Magnetic Perovskite**
C. COPPI, D. DELMONTE, R. CABASSI, E. GILIOLI, Institute of Materials for Electronics and Magnetism (IMEM), CNR, Parma, Italy; F. MEZZADRI, Department of Chemical Sciences, Life and Environmental Sustainability, University of Parma, Parma, Italy; F. CUGINI, M. SOLZI, Department of Mathematical, Physical and Computer Sciences, University of Parma, Parma, Italy

FD-1:IL04 **Magneto-ionics in Transition Metal Nitrides and its Potential for Artificial Synapses**
Z. TAN[1], J. DE ROJAS[1], S. MARTINS[1], A. NICOLENCO[1], J.L. COSTA-KRÄMER[2], A. QUINTANA[3], E. MENÉNDEZ[1], **J. SORT**[1, 4], [1]Departament de Física, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain; [2]IMN-Instituto de Micro y Nanotecnología (CNM-CSIC), Tres Cantos, Madrid, Spain; [3]Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, Barcelona, Spain; [4]Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain

FD-1:IL05 **Structural Transitions between Metastable Phases in Bismuth-containing Perovskite Multiferroics**
A.N. SALAK[1], J.P. CARDOSO[1], D. DELMONTE[2], E. GILIOLI[2], V.V. SHVARTSMAN[3], D.D. KHALYAVIN[4], [1]Department of Materials and Ceramics Engineering and CICECO - Aveiro Institute of Materials, University of Aveiro, Aveiro, Portugal; [2]Institute of Materials for Electronics and Magnetism, Parma, Italy; [3]Institute for Materials Science and CENIDE - Center for Nanointegration Duisburg-Essen, University of Duisburg-Essen, Essen, Germany; [4]ISIS Facility, Rutherford Appleton Laboratory, Chilton, Didcot, Oxfordshire, UK

FD-1:L06 **Structural, Magnetic and on Magnetocaloric Properties near the Paramagnetic to Ferromagnetic Phase Transition in La0.5o0.1Ca0.4MnO3 Oxide**
N. ASSOUDI, Université de Sfax, Kasserine, Tunisia

Session FD-2

Multiferroic nanostructures, self-assembly and nanocomposites

FD-2:IL01 **Growth and Functional Properties of 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-2:IL02 **Switchable Spin Springs at Oxide Interfaces**
K. DÖRR, M.M. KOCH, L. BERGMANN, A.D. RATA, A. HERKLOTZ, Institute of Physics, MLU Halle-Wittenberg, Halle, Germany

FD-2:L03 **Nanostructured Multiferroic Pb(Zr,Ti)O3-NiFe2O4 Thin-film Composites**
A. MATAVŽ, P. KOŽELJ, **V. BOBNAR**, Condensed Matter Physics Dept., Jožef Stefan Institute, Ljubljana, Slovenia; M. WINKLER, K. GEIRHOS, P. LUNKENHEIMER, Experimental Physics V, Center for Electronic Correlations and Magnetism, University of Augsburg, Augsburg, Germany

FD-2:IL04 **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-2:IL05 **Ferroelectric Photovoltaics**
A. BHATNAGAR, Zentrum für Innovationskompetenz (ZIK) SiLi-nano, Martin Luther Universität Halle-Wittenberg, Halle (Saale), Germany

FD-2:L06 **Crystal and Magnetic Structure of BiMnO3-based Ceramics**
D.V. KARPINSKY[1,2], D.V. ZHALUDKEVICH[2], S.I. LATUSHKA[2], M.V. SILIBIN[1], V.A. KHOMCHENKO[3], [1]National Research University of Electronic Technology "MIET", Zelenograd, Moscow, Russia; [2]Scientific-Practical Materials Research Centre of NAS of Belarus, Minsk, Belarus; [3]CFisUC, Department of Physics, University of Coimbra, Coimbra, Portugal

Session FD-3

Magnetoelectric characterization and electric field control of magnetization

FD-3:IL01 **Nanomagnetism of Magnetoelectric Granular Thin-film Antiferromagnets**
D. MAKAROV, Helmholtz-Zentrum Dresden-Rossendorf e.V., Institute of Ion Beam Physics and Materials Research, Dresden, Germany

FD-3: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-3:L03 **Operando Synchrotron Measurements of Magnetoelectric Coupling Effects in bi-layered Composite Multiferroics Comprising Ferroelectric HfO2**
A. DMITRIYEVA, V. MIKHEEV, A. CHOUPRIK, **A. ZENKEVICH**, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow region, Russia; Yu. MATVEYEV, Deutsches Elektronen-Synchrotron, Hamburg, Germany; G. VINAI, V. POLEWCZYK, P. TORELLI, Istituto Officina dei Materiali, Trieste, Italy: E.Y. TSYMBAL, University of Nebraska-Lincoln, Lincoln, USA

FD-3:IL04 **Tailoring Interface States in Oxide Tunnel Devices by Ferro-ionic Resistive Switching**
J. SANTAMARIA, GFMC, Departamento de Física de Materiales, Universidad Complutense de Madrid, Madrid, Spain

FD-3:IL05 **Local Writing of Exchange Biased Domains in a Heterostructure of Co/Pd pinned by Magnetoelectric Chromia**
U. SINGH, presently at XWave; M. STREET, presently at Seagate; W. ECHTENKAMP, C. BINEK, **S. ADENWALLA**, University of Nebraska-Lincoln, NE, USA

FD-3:L06 **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-3:IL07 **Magnetoelectric Effect in Composite Ferrite-perovskite Ceramics at Macro- and Microscopic Scales**
V.V. SHVARTSMAN[1], M. NAVEED UL-HAQ[2], D. LEWIN[1], D.C. LUPASCU[1], [1]Institute for Materials Science, University of Duisburg-Essen, Essen, Germany; [2]Department of Physics, COMSATS University Islamabad, Chak Shahzad, Islamabad, Pakistan

FD-3:IL08 **Discovery of Magnetoelectric Quadrupole Order and Visualization of their Domain Structure via Nonreciprocal Linear Dichroism**
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, Center for Advanced High Magnetic Field Science (AHMF), Osaka University, Osaka, Japan; S. KIMURA, Institute for Materials Research, Tohoku University, Sendai, Japan

FD-3:IL09 **Composite Material for Multiferroic Applications**
A. OMELYANCHIK[1,2], V. ANTIPOVA[1], C. GRITSENKO[1], V. KOLESNIKOVA[1], L. MAKAROVA[1,3], D. PEDDIS[2,4], K. LEVADA[1], A. AMIROV[1,5], **V. RODIONOVA**[1], [1]Immanuel Kant Baltic Federal University, Kaliningrad, Russia; [2]Department of Chemistry and Industrial Chemistry (DCIC), University of Genova, Genova, Italy; [3]Lomonosov Moscow State University, Faculty of Physics, Moscow, Russia; [4]Institute of Structure of Matter-CNR, Monterotondo Stazione, Rome, Italy; [5]Amirkhanov Institute of Physics of Dagestan Federal Research Center, Russian Academy of Sciences, Makhachkala, Russia

FD-3:IL10 **Controlling the Electrical, Magnetoelectric and Thermal Properties in Epitaxial-strain-engineered Ferroic Films**
E. LANGENBERG, Department of Condensed Matter Physics, Universitat de Barcelona, Barcelona, Spain

FD-3:IL11 **Multiferroics: Recent Developments and Trends**
A. LOIDL, Center for Electronic Correlations and Magnetism, University of Augsburg, Augsburg, Germany

Session FD-4

Multiferroics dynamics, new effects, devices and applications

FD-4: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-4: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

FD-4:IL03 **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-4:IL04 **Giant Thermal Transport Tuning at a Metal/Ferroelectric Interface**
Y. ZANG, C. DI, Z. GENG, X. YAN, D. JI, X. JIANG, H. FU, J. WANG, W. GUO, H. SUN, L. HAN, Y. ZHOU, Z. GU, D. KONG, H. ARAMBERRI, C. CAZORLA, J. ÍÑIGUEZ, R. RURALI, L. CHEN, J. ZHOU, D. WU, M. LU, **YUEFENG NIE**, Y. CHEN, X. PAN, Nanjing University, Nanjing, China

FD-4:L05 **High-frequency Molecular Dynamics Simulations of the Electrocaloric Effect in Ferroelectric PbTiO3**
S. LISENKOV, University of South Florida, Tampa, FL, USA

FD-4:L06 **Microstructure and Electro-optic Response of Thick Epitaxial BaTiO3 Films Integrated on Silicon (001) for Applications in Silicon Photonics**
M. REYNAUD[1], W. LI[1], A.B. POSADAS[1], **A.A. DEMKOV**[1], Z. DONG[2], D. WASSERMAN[2], H. PARK[3,4], J.H. WARNER[3,4], W. CAO[5], G.Z. MASHANOVICH[5], [1]Department of Physics, University of Texas at Austin; [2]Department of Electrical and Computer Engineering, University of Texas at Austin; [3]Materials Science and Engineering Program and Texas Materials Institute, The University of Texas at Austin, Austin, TX, USA; [4]Walker Department of Mechanical Engineering, The University of Texas at Austin, Austin, TX, USA; [5]Optoelectronics Research Centre, Faculty of Engineering and Physical Sciences, University of Southampton, Southampton, UK

FD-4:L07 **Manoeuvring Phase Connectivity to Realise Enhanced Magnetoelectric Effect in distributed Disc structured Ni/PZT Composite**
A. KUMAR[1], A. AROCKIARAJAN[1,2], [1]Department of Applied Mechanics, Indian Institute of Technology Madras, Chennai, India; [2]Ceramic Technologies Group-Centre of Excellence in Materials and Manufacturing for Futuristic Mobility, Indian Institute of Technology Madras, Chennai, India

FD-4:IL08 **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-4:IL09 **Multiferroicity in Hexagonal Rare Earth Ferrites**
XIAOSHAN XU, University of Nebraska-Lincoln, Lincoln, NE, USA

FD-4:IL10 **Taylored Magnetostrictive Multilayers for Magnetoelectric Sensors**
D. MEYNERS, Inorganic Functional Materials, Institute of 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 (CNTs, graphene)-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. RAZA[1], K. MOVLAEE[2,3], S.G. LEONARDI[3], N. BARSAN[4], G. NERI[3], **N. PINNA**[1], [1]Institut für Chemie and IRIS Adlershof, Humboldt-Universität zu Berlin, Berlin, Germany; [2]Center of Excellence in Electrochemistry, School of Chemistry, College of Science, University of Tehran, Iran; [3]Department of Engineering, University of Messina, Messina, Italy; [4]Institute of Physical and Theoretical Chemistry, University of Tübingen, Tübingen, Germany

FE-1:IL02 **High-performance Flexible Gas Sensors based on Carbon-based Nanostructures**
SEON-JIN CHOI, Division of Materials of Science and Engineering, Hanyang University, Seoul, South Korea

FE-1:IL03 **Chemical Design of Carbon-based Nanostructures for Sensing Applications**
A. SINITSKII, University of Nebraska-Lincoln, Lincoln, NE, USA

FE-1:L04 **Dual-hydrogen Bond Donor Functionalized Single-walled Carbon Nanotubes for improved NO2 Sensing**
JOON-SEOK LEE, S.H. CHOI, W.J. CHOI, J.W. SEO, S.J. CHOI, Division of Materials of Science and Engineering, Hanyang University, Seoul, South Korea

Session FE-2
Semiconductor metal oxides-based gas sensors

FE-2:IL01 **Vapour Deposition of Functional Semiconductor Nanomaterials for Gas Sensing**
C.S. BLACKMAN, Department of Chemistry, University College London, UK

FE-2:IL02 **Solid-state Micro Gas Sensors for Detection of Oxygen and Acidic Gases**
KENGO SHIMANOE[1], S. IDE[2], K. WATANABE[1], K. SUEMATSU[1], [1]Faculty of Engineering Sciences, Kyushu University, Japan; [2]Mitsui-Mining & Smelting Co., Ltd., Japan

FE-2:IL03 **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:IL04 **Light-activated Semiconductor Gas Sensors: Achievements and Challenges**
M.N. RUMYANTSEVA[1], A.F. NASRIDDINOV[1, 2], A.S. CHIZHOV[1], R.B. VASILIEV[1, 2], S.D. TOKAREV[3], O.A. FEDOROVA[3], A.M. GASKOV[1], [1]Chemistry Department, Moscow State University, Moscow, Russia; [2]Department of Materials Science, Moscow State University, Moscow, Russia; [3]A.N. Nesmeyanov Institute of Organoelement Compounds of Russian Academy of Sciences, Moscow, Russia

FE-2:IL05 **Multi-scale Structuring of Nanoparticle Networks for Enhanced Chemical Sensing**
A. TRICOLI, Nanotechnology Research Laboratory, Australian National University, Canberra, Australia

FE-2:IL06 **High Selective Catalyst-filtered Chemoresistive Gas Sensors**
A. GÜNTNER, Department of Endocrinology, Diabetology, and Clinical Nutrition, University Hospital Zurich (USZ) and University of Zurich (UZH), Zurich, Switzerland

FE-2:IL07 **Recent Advances in Thin Films of Metal Oxides as Gas Sensing Materials**
K. ZAKRZEWSKA, AGH-University of Science and Technology, Faculty of Computer Science, Electronics and Telecommunications, Institute of Electronics, Kraków, Poland

FE-2:IL08 **Precious Metal-free Catalytic Combustion-type CO Gas Sensor Based on CeO2-ZrO2-ZnO Solid Solution**
SHINJI TAMURA, Osaka University, Suita, Osaka, Japan

FE-2:L09 **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

Session FE-3
Novel 2D inorganic materials-based gas sensors

FE-3:IL01 **2D Materials for Gas Sensors**
L. OTTAVIANO, Dipartimento di Scienze Fisiche e Chimiche, Università dell'Aquila, L'Aquila, Italy

FE-3:IL02 **Liquid Metal Facilitated Synthesis of 2D Materials**
T. DAENEKE, RMIT University, Melbourne, Victoria, Australia

FE-3:IL03 **Layered Amorphous Metal Oxide Gas Sensors by Controlled Oxidation of 2D-MDs**
V. PAOLUCCI[1], J. DE SANTIS[1], G. GIORGI[2, 3], C. CANTALINI[1], [1]Department of Industrial and Information Engineering and Economics, University of L'Aquila, Italy; [2]Department of Civil and Environmental Engineering (DICA), University of Perugia, Italy; [3]CNR-SCITEC, Perugia, Italy

Session FE-4
Enzyme-free sensors based on functional nanomaterials

FE-4:IL01 **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

FE-4:IL02 **Capacitive Field-effect Devices for Biosensor Applications**
M.J. SCHOENING, FH Aachen, Institute of Nano- and Biotechnologies, Juelich, Germany

FE-4:IL03 **Optical Detection of Chemicals and Biological Entities on Gold Nanostructured Solid Supports**
R.E. IONESCU, Laboratoire Lumière, Nanomatériaux et Nanotechnologies-L2n, CNRS ERL 7004, Université de Technologie de Troyes, Troyes, France

Session FE-5
Nanocomposite/hybrid/heterostructure-based chemical- and bio-sensors

FE-5:IL01 **MWCNTs Based Smart Fabrics for Wearable Gas Sensors**
R.T. RAJENDRA KUMAR, Advanced Materials and Devices Laboratory (AMDL), Dept. of Nanoscience and Technology, Bharathiar University, Coimbatore, India

FE-5:L02 **Flexible Plasmonic PEGDA Hydrogels for Biosensing Applications**
B. MIRANDA[1, 2], S. DE MARTINO[3], R. MORETTA[1], P. DARDANO[1], I. REA[1], C. FORESTIERE[2], L. DE STEFANO[1], [1]Institute of Applied Sciences and Intelligent Systems, Napoli, Italy; [2]DIETI, Università degli Studi di Napoli "Federico II", Napoli, Italy; [3]Materias s.r.l., Napoli, Italy

FE-5:L03 **Organic-inorganic Hybrid Materials: NO and NO2 Sensing Properties and Surface Reactivity**
A. NASRIDDINOV[1], S. TOKAREV[2], O. FEDOROVA[2], M. RUMYANTSEVA[1], [1]Chemistry Department, Lomonosov Moscow State University, Moscow, Russia; [2]A.N. Nesmeyanov Institute of Organoelement Compounds RAS, Moscow, Russia

FE-5:L04 **Single Walled Carbon Nanotube-polymer Composite for Real-time Wireless Heavy Metal Ion Sensing**
SEUNG-HO CHOI, J.S. LEE, W.J. CHOI, J.W. SEO, S.J. CHOI, Hanyang University, Seoul, South Korea

FE-5:IL05 **Gas Sensors based on Metal Oxide Nano-heterojuntions**
E. LLOBET, E. NAVARRETE, Universitat Rovira i Virgili, MINOS, Tarragona, Spain

FE-5:IL06 **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:IL07 **Nanoparticle Networks for Label-free Biosensing**
D. TSOUKALAS, E. SKOTADIS, M. KAINOURGAKI, Dept. of Applied Physics, National Technical University of Athens, Greece; G. TSEKENIS, Biomedical Research Foundation of the Academy of Athens, Athens, Greece

FE-5:IL08 **LDI-Mass Spectrometry based on Nanomaterials for Biomedical Applications**
JAE-CHUL PYUN, Department of Materials Science and Engineering, Yonsei University, Seoul, South Korea

SYMPOSIUM FF
ELECTROMAGNETIC METAMATERIALS AND METASURFACES: RECENT RESEARCH ACHIEVEMENTS AND NEW PARADIGMS

Session FF-1
Physics and modelling of metamaterials / 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 **Selective Visualization of Multipoles by Cathodoluminescence**
T. SANNOMIYA, Tokyo Institute of Technology, Yokohama, Japan

FF-1:L04 **Spatial Multiplexing Method for Multiwavelength Metalens**
SANGWON BAEK[1], J. KIM[2], Y. KIM[2], J. RHO[2], J.-L. LEE[1], [1]Department of Materials Science and Engineering, Pohang University of Science and Technology, South Korea; [2]Department of Mechanical Engineering, Pohang University of Science and Technology, South Korea

FF-1:IL05 **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], [1]Sapienza University of Rome, Department of Basic and Applied Sciences for Engineering, Rome, Italy; [2]Laboratoire Charles Coulomb (L2C), UMR 5221 CNRS-Université de Montpellier, Montpellier, France; [3]Institut Universitaire de France, Paris, France

Session FF-2
Novel concepts and new materials

FF-2:IL01 **Nanopillars Arrays as Anisotropic Metamaterials and Metasurfaces**
A.V. LAVRINENKO[1], E. SHKONDIN[1], O. TAKAYAMA[1], R. MALUREANU[1], M. E. ARYAEE PANAH[1], O.Y. YERMAKOV[2], A.A. BOGDANOV[2], S. CHATTERJEE[3], G. STRANGI[3], [1]Technical University of Denmark, Kgs. Lyngby, Denmark; [2]ITMO University, Saint Petersburg, Russia; [3]Case Western Reserve University, Cleveland, USA

FF-2:IL02 **Some Recent Advances in Non-Hermitian Metastructures**
V. GALDI, University of Sannio, Benevento, Italy

FF-2:IL03 **Topological Slow Light beyond the Time-bandwidth Limit**
K.L. TSAKMAKIDIS, K. BASKOURELOS, Department of Physics, National and Kapodistrian University of Athens, Panepistimioupolis, Athens, Greece

FF-2:IL04 **Lithium Niobate Metasurfaces for Nonlinear Light Sources**
T. PERTSCH, Abbe Center of Photonics, Friedrich Schiller University Jena, Jena, Germany

FF-2:L05 **Ultrathin Suspended Membrane Metasurfaces for Efficient Terahertz Light Absorption and Modulation**
A. OTTOMANIELLO, V. MATTOLI, Center for Materials Interfaces, Istituto Italiano di Tecnologia, Pontedera, Italy; P. VEZIO, A. TREDICUCCI, Dipartimento di Fisica, University of Pisa, Pisa, Italy; S. ZANOTTO, A. PITANTI, Laboratorio NEST Scuola Normale Superiore, and Istituto Nanoscienze CNR, Pisa, Italy

FF-2:IL06 **Superemission and Superabsorption Effects in Metamaterials**
S.I. MASLOVSKI, Instituto de Telecomunicações and Department of Electronics, Telecommunications and Informatics, University of Aveiro, Aveiro, Portugal

FF-2:L07 **Hierarchically Structured Functional Ceramic Composites for Microwave Absorption using Graphene Augmented Inorganic Nanofibers**
A. SAFFAR SHAMSHIRGAR[1], R.E. ROJAS HERNÁNDEZ[1], G.C. TEWARI[2], J.F. FERNÁNDEZ[3], R. IVANOV[1], M. KARPPINEN[2], I. HUSSAINOVA[1], [1]Department of Mechanical and Industrial Engineering, Tallinn University of Technology, Tallinn, Estonia; [2]Department of Chemistry and Materials Science, Aalto University, Aalto, Finland; [3]Institute of Ceramics and Glass (ICV-CSIC), Madrid, Spain

FF-2:L08 **Ultrashort Pulse Laser-fabricated Metasurfaces and Optoelectronic Platforms on Diamond**
A. BELLUCCI, M. MASTELLONE, M. GIROLAMI, V. SERPENTE, R. POLINI, S. ORLANDO, A. SANTAGATA, **D.M. TRUCCHI**, Institute for Structure of Matter ISM-CNR, Monterotondo (RM), Italy

Session FF-3
Mie-resonant nanophotonics

FF-3:IL01 **Artificial Chirality Evolution in Micro-/Nano-scale 3D Plasmonic Metamaterials**
JUNSUK RHO, Pohang University of Science and Technology (POSTECH), Pohang, South Korea

FF-3:IL02 **Mie Metasurfaces with van der Waals Antennas and Nanostructures**
V. BABICHEVA, Department of Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM, USA

FF-3:IL03 **Multipole Analysis and Tuning of All-dielectric Metasurfaces Supporting High-quality Optical Resonances and Quasi-trapped Mode Responses**
A.B. EVLYUKHIN, Institute of Quantum Optics, Leibniz Universität Hannover, Hannover, Germany

Session FF-4
Functional metasurfaces

FF-4:IL01 **Geometric Phase and Nonlinear Photonic Metasurfaces**
GUIXIN LI, Department of Materials Science and Engineering, Southern University of Science and Technology, Shenzhen, China

FF-4:IL02 **Temporally Modulated Metasurfaces for Extreme Control of Light and Electromagnetic Radiation**
XUCHEN WANG, A. DÍAZ RUBIO, V. ASADCHY, G. PTITCYN, M. MIRMOOSA, S. TRETYAKOV, Department of Electronics and Nanoengineering, Aalto University, Espoo, Finland

FF-4:IL03 **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:IL04 **Metamaterials for Ultra-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

FF-4:IL05 **Conformable Holographic Metasurfaces**
A. DI FALCO, School of Physics and Astronomy, University of St Andrews, UK

Session FF-5
Quantum and topological meta-optics

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 **High-performance Topological Cavity Surface Emitting Laser (TCSEL)**
XIAO HU, International Center for Materials Nanoarchitectonics (WPI-MANA), National Institute for Materials Science (NIMS), Tsukuba, Japan

FF-5:IL04 **Probing Leaky and Guided Polaritonic Modes in Planar Dielectric Structures Coupled to 2D Semiconductors**
A. SAMUSEV, School of Physics and Engineering, ITMO University, St. Petersburg, Russia

FF-5:IL05 **Nonlinear Optical Switching and Tunability in AlGaAs Nanoantennas and Metasurfaces**
C. DE ANGELIS, D. ROCCO, Department of Information Engineering, University of Brescia, Brescia, Italy

FF-5:IL06 **Topological Photons and Phonons in Nanophotonic Architectures**
E. VERHAGEN, Center for Nanophotonics, AMOLF, Amsterdam, The Netherlands

FF-5:IL07 **Topological Phase Transition in Photonic Crystals and Metamaterials**
D. FELBACQ, University of Montpellier, Montpellier, France

FF-5:IL08 **Quantum Topological Edge States induced by Photon-photon Interactions**
A.N. PODDUBNY, Ioffe Institute, St. Petersburg, Russia; Australian National University, Canberra ACT, Australia

Session FF-6

Active metamaterials

FF-6:IL01 **Metasurfaces for Holography and Light Harvesting: New Approaches with Orbital Angular Moment Modes and Tailored Disorder**
S.A. MAIER, Nanoinstitute Munich, LMU Munich, Germany

FF-6:IL02 **Controlling the Parity and Time-reversal Symmetry of Metasurfaces in Current-driven Graphene Dirac Plasmons**
TAIICHI OTSUJI, Research Institute of Electrical Communication, Tohoku University, Sendai, Japan

FF-6:IL03 **Broadband Active Control of Light-matter Interactions with Metal-dielectric Nanocavities**
N. MACCAFERRI, Department of Physics and Materials Science, University of Luxembourg, Luxembourg, & Department of Physics, Umeå University, Umeå, Sweden

FF-6:IL04 **Non-Hermitian Mechanics**
C. COULAIS, University of Amsterdam, The Netherlands

FF-6:IL05 **Low-threshold Topological Nanolasers**
HONG-GYU PARK, Department of Physics at Korea University, Seoul, South Korea

SYMPOSIUM FG

ADVANCES IN INORGANIC LUMINESCENT MATERIALS

Session FG-1

Physics, modelling, processing and characterization of luminescent materials

FG-1:IL01 **Accelerating Phosphor Discovery and Development through Data Science**
M. Amachraa[1], Z. Wang[1], C. Chen[1], S. Hariyani[2], J. Brgoch[2], **SHYUE PING ONG**[1], [1]Materials Science and Engineering Program, University of California San Diego, La Jolla, CA, USA; [2]Department of Chemistry, University of Houston, College of Natural Sciences and Mathematics, Houston, TX, United States

FG-1:IL02 **Ag-Sensitized Tb3+/Yb3+ Codoped Silica-Zirconia Glasses and Glass-Ceramics**
F. ENRICHI, Department of Computer Science, University of Verona, Verona, Italy

FG-1:IL03 **Rapid Screening of New Phosphor Compositions using Novel Soft Chemical Technique**
KENJI TODA, Niigata University, Niigata, Japan

FG-1:IL04 **The Principles of Luminescence Thermometry – From Applications to Fundamental Questions**
M. SUTA, Inorganic Photoactive Materials, Institute of Inorganic Chemistry, Heinrich Heine University Düsseldorf, Düsseldorf, Germany

FG-1:IL05 **Plasmon Mediated Directionality and Spatial Coherence in Rare Earth Quantum Emitters**
J. FERNÁNDEZ-MARTÍNEZ[1], L. SANCHEZ-GARCIA[1], S. CARRETERO-PALACIOS[1], J. BRAVO-ABAD[2], P. MOLINA[1], N.J.J. VAN HOOF[3], J. GÓMEZ RIVAS[3], M.O RAMÍREZ[1], **L.E. BAUSÁ**[1], [1]Dept. Física de Materiales, Instituto de Materiales Nicolás Cabrera and Condensed Matter Physics Center (IFIMAC), Universidad Autónoma de Madrid, Madrid, Spain; [2]Dept. Física Teórica de la Materia Condensada and Condensed Matter Physics Center (IFIMAC), Universidad Autónoma de Madrid, Madrid, Spain; [3]Dutch Institute for Fundamental Energy Research, DIFFER, and Eindhoven University of Technology, AE Eindhoven, The Netherlands

FG-1:IL06 **Rare-earth Activated SiO2-SnO2 Photonic Glass-ceramics**
THI NGOC LAM TRAN[1, 2, 3], A. SZCZUREK[1], S. VARAS[1], C. ARMELLINI[1], A. CARPENTIERO[1], A. CHIAPPINI[1], E. IACOB[4], G. ISCHIA[5], S. BERNESCHI[6], G. NUNZI CONTI[6], G.C. RIGHINI[6], M. BOLLANI[7], F. SCOTOGNELLA[2, 8], P. GŁUCHOWSKI[9], A. LUKOWIAK[9], A. CHIASERA[1], M. FERRARI[1], [1]IFN-CNR CSMFO Lab. and FBK Photonics Unit, Povo, Trento, Italy; [2]Department of Physics, Politecnico di Milano, Milano, Italy; [3]Department of Materials Technology, Faculty of Applied Science, Ho Chi Minh City University of Technology and Education, Thu Duc District, Ho Chi Minh City, Vietnam; [4]Fondazione Bruno Kessler, Centre for Materials and Microsystems, Micro Nano Facility, Povo, Trento, Italy; [5]Department of Industrial Engineering, University of Trento, Povo, Trento, Italy; [6]MiPLab, IFAC-CNR, Sesto Fiorentino, Italy; [7]IFN-CNR, P.zza Leonardo da Vinci, Milano, Italy; [8]Center for Nano Science and Technology@PoliMi, Istituto Italiano di Tecnologia (IIT), Milan, Italy; [9]Institute of Low Temperature and Structure Research, PAS, Wroclaw, Poland

FG-1:IL07 **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:IL08 **Electron Transfer between Lanthanide Impurities: Insights from Multiconfigurational Calculations**
J.J. JOOS, LumiLab, Department of Solid State Sciences, Ghent University, Gent, 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:L09 **New Near-IR Optical Transitions in Sm3+ and Sm3+-Yb3+ doped Tellurite Glasses and Application in Tissue Transmission Spectroscopy**
E. KUMI-BARIMAH, G. SHARMA, Y. CHEN, R. TENWICK, M. EL-MURISH, A. JHA. School of Chemical and Process Engineering, University of Leeds, Woodhouse, Leeds, UK

FG-1:IL10 **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-1:IL11 **Theoretical Discussion of Mn4+ Luminescence**
M.G. BRIK[1, 2, 3], A.M. SRIVASTAVA[4], M. PIASECKI[3], [1]College of Sciences, Chongqing University of Posts and Telecommunications, Chongqing, China; [2]Institute of Physics, University of Tartu, Tartu, Estonia; [3]Institute of Physics, Jan Dlugosz University, Czestochowa, Poland; [4]Srivastava consulting LLC, Niskayuna, NY, USA

FG-1:L12 **Delineating the Effects of Metal Co-doping for Improved Upconversion in Inorganic Phosphors: A Case Study in Gadolinium Vanadate**
A. CHAUHAN[1], S. KATARIA[1], D. BUSKO[1], F.A. CARDONA[1], **A. TURSHATOV**[1], B.S. RICHARDS[1, 2], [1]Institute of Microstructure Technology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; [2]Light Technology Institute, Karlsruhe Institute of Technology, Karlsruhe, Germany

FG-1:L13 **Alkaline-alumina-borate Glass-ceramics with Chromium: the Effect of the Matrix Components Ratio on the Luminescent Properties**
A. BABKINA, E. KULPINA, K. ZYRYANOVA, A. BUKHVOSTOV, N. NIKONOROV, ITMO University, Saint-Petersburg, Russia

FG-1:L14 **Carbon Dots Impregnated Transparent Fluorescent Polymer Materials**
C.-M. SINGARAVELU[1], X. DESCHANELS, C. REY, J. CAUSSE, ICSM, University of Montpellier, CEA, CNRS, ENSCM, Marcoule, France

FG-1:L15 **Stable Aqueous Colloidal Solutions of Nd3+: LaF3 Nanocrystals with Bright Luminescence in the Near IR Spectral Range**
YU.V. ORLOVSKII, E.A. VAGAPOVA, A.S. VANETSEV, Institute of Physics, University of Tartu, Tartu, Estonia; YU.V. ORLOVSKII, A.V. POPOV, E.O. ORLOVSKAYA, E.A. VAGAPOVA, A.T. SHAIDULIN, E.E. TIMOFEEVA, O.V. UVAROV, Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; A.T. SHAIDULIN, D. MENDELEEV, University of Chemical Technology of Russia, Moscow, Russia; S.G. FEDORENKO, Voevodsky Institute of Chemical Kinetics and Combustion SB RAS, Novosibirsk, Russia

Session FG-2

Phosphors, quantum dots 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 **Direct Laser Patterning as a Possible Strategy for Spatially Controlled QDs Formation**
F. ANTOLINI, F. LIMOSANI, R. CARCIONE, ENEA C.R. Frascati, Fusion and Technologies for Nuclear Safety and Security Department, Physical Technologies for Safety and Health Division, Micro and Nanostructure Laboratory, Italy; L. ORAZI, Department of Science and Methods for Engineering, University of Modena and Reggio Emilia, Reggio Emilia, Italy; R. GILLANDERS, I.D.W. SAMUEL, University of St. Andrews, St. Andrews, UK

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:L04 **Large Size Persistent Luminescence Materials**
T. DELGADO, B. VIANA, PSL University, Chimie ParisTech, IRCP-CNRS, Paris, France; D. RYTZ BREVALOR, Sarl, Les Sciernes-d'Albeuve, Switzerland; E. VÉRON, M. ALLIX, CNRS, CEMHTI UPR 3079, Univ. Orléans, Orléans, France

Session FG-3

Advances in scintillator development 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. KRUKEWITT, 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. PLANELLES[4], J.I. CLIMENTE[4], D. ORON[3], **I. MOREELS**[1,2], [1]Department of Chemistry, Ghent University, Ghent, Belgium; [2]Istituto Italiano di Tecnologia, Genova, Italy; [3]Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot, Israel; [4]Departament de Química Física i Analítica, Universitat Jaume I, Castelló de la Plana, Spain

Session FG-4

Sensing and imaging

FG-4:IL01 **Ultra-sensitive Luminescent Thermometry by Cr3+ Doped Materials**
SETSUHISA TANABE, M. BACK Graduate School of Human & Environmental Studies, Kyoto University, Kyoto, Japan

FG-4:IL02 **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:IL03 **Eu(III) and Tb(III) Complexes for Biosensing Applications**
F. PICCINELLI, C. NARDON, M. BETTINELLI, Luminescent Materials Laboratory, University of Verona, Verona, Italy

FG-4:IL04 **Single-cell Thermodynamics: Measurement of Cellular Heat Dissipation via Transient Imaging**
P. SONG, H. GAO, Z. GAO, **BIN KANG**, State Key Laboratory of Analytical Chemistry for Life Science, School of Chemistry and Chemical Engineering, Nanjing University, Nanjing, China

FG-4:L05 **Facile Fabrication of Carbon Dots based Fluorescent Strips for Florimetric ON-OFF Sensor**
C.M. SINGARAVELU, X. DESCHANELS, C. REY, **J. CAUSSE**, ICSM, University of Montpellier, CEA, CNRS, ENSCM, Marcoule, France

Session FG-5

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

FG-5:IL01 **Using EuD4TEA to Detect Impacts, Radiation Exposure, and Surface Temperatures in Adverse Environments**
W.A. HOLLERMAN, Department of Physics, University of Louisiana at Lafayette, Lafayette, LA, USA

FG-5:IL02 **Development of Novel Chemiluminescent Materials for Cancer Treatment**
C.M. MAGALHÃES, P.G. BERDULLAS, J.C.G. ESTEVES DA SILVA, **L. PINTO DA SILVA**, Chemistry Research Unit of University of Porto, Porto, Portugal

Session FG-6

Light management for active applications and luminescent materials integration in devices

FG-6:IL01 **Simulating Out-coupling and Radiation Patterns from Luminescent Materials in Lighting Applications**
Y. MEURET, B. KARADZA, A. CORREIA, KU Leuven, ESAT, Light and Lighting Laboratory, Ghent, Belgium

FG-6:L02 **Optimal Quantum Dot Luminescent Solar Concentrator Double and Triple Tandem Structures Based on Ray Tracing Simulations**
T. DE BRUIN, **W. VAN SARK**, Copernicus Institute of Sustainable Development, Utrecht University, Utrecht, The Netherlands

FG-6:L03 **Thermometric and Pressure Independent Nano-probe via Upconversion Photoluminescence: Application to Temperature Measurement in Tribological Contacts**
YUJIAO ZHOU, L. BOIS, C. JOURNET-GAUTIER, Lab. des Multimatériaux et Interfaces, UMR CNRS 5615, Université Lyon1-CNRS, Villeurbanne, France; S. DESCARTES, D. PHILIPPON. Univ Lyon, INSA Lyon, CNRS, LaMCoS - UMR5259, Villeurbanne, France; G. LEDOUX, Institut Lumière Matière, UMR CNRS 5306, Université Lyon1-CNRS, Villeurbanne, France

FG-6:IL04 **Nanomaterials and Molecular Photoanodes for Light-driven Water Splitting**
J. LI, H. CHEN, C.A. TRIANA, **G.R. PATZKE**, University of Zurich, Department of Chemistry, Zurich, Switzerland

FG-6:L05 **Unclonable Anti-counterfeiting Based on Randomly Distributed Microphosphor Particles under Microlens Arrays**
V. KUMAR, S. DOTTERMUSCH, A. CHAUHAN, N. KATUMO, B.S. RICHARDS, I.A. HOWARD, Institute of Microstructure Technology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany Light Technology Institute, Karlsruhe Institute of Technology, Karlsruhe, Germany

Session FG-7

Medical applications and bioimaging

FG-7:IL01 **It's Getting Hot in Here: Intracellular Luminescent Thermometers**
L.D. CARLOS, Phantom-g, CICECO-Aveiro Institute of Materials, Physics Department, University of Aveiro, Campus Universitário de Santiago, Aveiro, Portugal

FG-7:IL02 **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:IL03 **Ultrafast Photochemistry produces Superbright Short-wave Infrared Dots for Low-dose in Vivo Imaging**
H.D.A. SANTOS[1,2], I. ZABALA[3], Y. SHEN[1], J. LIFANTE[4,5], E. XIMENDES[1,4], M. LAURENTI[3,4], D. MENDEZ-GONZALEZ[3], S. MELLE[6], O.G. CALDERON[6], E. LOPEZ CABARCOS[3], N. FERNANDEZ[4,5], I. CHAVES-COIRA[7], D. LUCENA-AGELL[10], L. MONGE[4,6], M.D. MACKENZIE[8], J. MARQUES-HUESO[9], C.M.S. JONES[9], C. JACINTO[2], B. DEL ROSAL[11], A.A. KAR[9], J. RUBIO RETAMA[3,4], **D. JAQUE**[1,4], [1]Fluorescence Imaging Group, Depto de Física de Materiales, Facultad de Ciencias, Universidad Autónoma de Madrid, Madrid, Spain; [2]Group of Nano-Photonics and Imaging, Instituto de Física, Universidade Federal de Alagoas, Maceió, Brazil; [3]Depto de Química en Ciencias Farmacéuticas, Universidad Complutense de Madrid, Spain; [4]Nanobiology Group, Instituto Ramón y Cajal de Investigación Sanitaria, Hospital Ramón y Cajal, Madrid, Spain; [5]Fluorescence Imaging Group, Depto de Fisiología, Facultad de Medicina, Universidad Autónoma de Madrid, Madrid, Spain; [6]Dept. of Optics, Complutense University of Madrid, Madrid, Spain; [7]Dept. of Anatomy, Histology and Neuroscience, Facultad de Medicina, Universidad Autónoma de Madrid, Madrid, Spain; [8]Institute of Photonics and Quantum Sciences, School of Physics, Heriot-Watt University, Edinburgh, UK; [9]Institute of Sensors, Signals and Systems (ISSS), School of Engineering & Physical Sciences (EPS), Heriot-Watt University, Edinburgh, UK; [10]Chemical and Physical Biology, Centro de Investigaciones Biologicas, Consejo Superior de Investigaciones Cientificas CIB–CSIC, Madrid, Spain; [11]Centre for Micro-Photonics, Faculty of Science, Engineering and Technology, Swinburne University of Technology, Hawthorn, VIC, Australia

FG-7:IL04 **Photoactive Nanoclay Carriers and Functionalized Upconverting Nanoparticles for Biophotonic Applications**
A. DE CAMARGO, São Carlos Institute of Physics, University of São Paulo, São Carlos, SP, Brazil

FH - 4th International Conference

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

Session FH-1.1

Phase Change Memories (PCM): materials, devices and applications

FH-1.1:IL01 **Two-dimensional Chalcogenides for Advanced Memory Applications**
A.V. KOLOBOV[1,2], P. FONS[2], Y. SAITO[2], J. TOMINAGA[2], [1]Herzen University, St. Petersburg, Russia; [2]AIST, Japan

FH-1.1:L02 **New Insight into the Origin of the Resistive Switching Mechanism and the Low Power Consumption of GeTe/Sb2Te3 Superlattices in Phase-change Memory Devices**
D. TEREBENEC[1], N. CASTELLANI[1], N. BERNIER[1], V. SEVER[1], P. KOWALCZYK[1], M. BERNARD[1], M.-C. CYRILLE[1], N.-P. TRAN[1], J.-Y. RATY[1,2], F. D'ACAPITO[3], F. HIPPERT[4], P. NOÉ[1], [1]Université Grenoble Alpes, CEA, LETI, Grenoble, France; [2]CESAM-Physics of Solids Interfaces and Nanostructures, B5, Université de Liège, Belgium; [3]CNR-IOM-OGG c/o ESRF - The European Synchrotron, Grenoble, France; [4]Université Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France

FH-1.1:L03 **Analysis of Ge-incorporation and Crystallization Study in GexSbyTez Phase Change Alloys for Automotive Applications**
A. DIAZ FATTORINI, F. DE NICOLA, M. BERTELLI, S. DE SIMONE, V. MUSSI, R. CALARCO, **M. LONGO**, CNR-IMM Unit of Rome, Rome, Italy

FH-1.1:L04 **Electronic Properties of Phase Change Material Heterostructures based on Ge-rich Ge-Sb-Te Alloys**
F. RIGHI RIVA[1], C. CHÈZE[1], E. PLACIDI[2], G. DI BELLA[2], S. PRILI[1], A. DIAZ FATTORINI[3], S. CECCHI[4], V. MUSSI[3], S. DE SIMONE[3], M. LONGO[3], R. CALARCO[3], M. BERNASCONI[5], O. ABOU EL KHEIR[5], F. ARCIPRETE[1], [1]Department of Physics, University of Rome Tor Vergata, Roma, Italy; [2]Department of Physics, Sapienza University of Rome, Rome, Italy; [3]CNR Institute for Microelectronics and Microsystems-IMM, Consiglio Nazionale delle Ricerche, Roma, Italy; [4]Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany; [5]Department of Materials Science, University of Milano-Bicocca, Milan, Italy

FH-1.1:L05 **The Role of (dis)Order on the Structural-electronic Interplay in Amporphous GexSe1-x: A Microscopic Investigation**
F. TAVANTI, A. SLASSI, **A. CALZOLARI**, CNR-NANO Istituto Nanoscienze, Modena, Italy

FH-1.1:L06 **Selective MOCVD Growth of Sb-Te and In-Ge-Te Nanostructures on Templated Substrates for Phase Change Memories**
R. CECCHINI[1,2], M. LONGO[1,3], C. MARTELLA[1], A. LAMPERTI[1], S. BRIVIO[1], F. ROSSI[4], L. LAZZARINI[4], E. VARESI[5], [1]CNR-IMM, Unit of Agrate Brianza, Agrate Brianza (MB), Italy; [2]CNR-IMM, Bologna, Italy; [3]CNR-IMM, Rome, Italy; [4]CNR-IMEM, Parma, Italy; [5]Micron Technology Inc., Vimercate (MB), Italy

FH-1.1:L07 **Shape Controlled Self-assembly of Core Shell Ge-Sb-Te/Sb2Te3 Nanowires by MOCVD**
A. KUMAR, **C. WIEMER**, CNR-IMM Unit of Agrate Brianza, Agrate Brianza, Italy; R. CECCHINI. CNR-IMM Unit of Bologna, Bologna, Italy; M. SCUDERI, G. NICOTRA, CNR-IMM Unit of Catania, Catania, Italy; V. MUSSI, S.D. SIMONE, R. CALARCO, M. LONGO, CNR-IMM Unit of Rome, Rome, Italy

FH-1.1:L08 **Femtosecond Laser Modification of GST225 Amorphous Thin Films: Crystallization and LIPSS Formation**
S. KOZYUKHIN, T. KUNKEL, Kurnakov Institute of General and Inorganic Chemistry, RAS, Moscow, Russia; P. LAZARENKO, National Research University of Electronic Technology, Zelenograd, Russia; M. SMAYEV, Mendeleev University of Chemical Technology of Russia, Moscow, Russia; YU. VOROBYEV, Ryazan State Radio Engineering University, Ryazan, Russia

FH-1.1:IL09 **Deep Learning Inference and Training using Computational Phase-change Memory**
M. LE GALLO, A. SEBASTIAN, IBM Research Europe, Rueschlikon, Switzerland

FH-1.1:IL10 **Chalcogenide Materials for Innovative Phase-Change Memories, Ovonic Threshold Switching Selectors and Photonic Devices**
P. NOE[1], M. TOMELLERI[1,2], D. TÉRÉBENEC[1], A. ALBANESE[1], J. PATERSON[1], A. VERDY[1], J.-B. DORY[1], J.-B. JAGER[3], V. M. GIORDANO[4], D. BENOIT[2], F. D'ACAPITO[5], B. CLUZEL[6], F. HIPPERT[7], J.-Y. RATY[1,8], [1]Univ. Grenoble Alpes, CEA, LETI, MINATEC campus, Grenoble, France; [2]STMicroelectronics, Crolles, France; [3]Univ. Grenoble Alpes, CEA, IRIG, MINATEC campus, Grenoble, France; [4]ILM, UMR 5306 Univ. Lyon 1-CNRS, Villeurbanne Cedex, France; [5]CNR-IOM-OGG c/o ESRF – The European Synchrotron, Grenoble, France; [6]ICB, UMR CNRS 6303, Université Bourgogne Franche-Comté, Dijon cedex, France; [7]Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; [8]CESAM-Physics of Solids Interfaces and Nanostructures, B5, Université de Liège, Belgium

FH-1.1:L11 **C-based Phase-change Material Nanocomposites for Improved Phase-change Memory**
J. PATERSON[1], M. TOMELLERI[1,2], D.TÉRÉBENEC[1], R.R. CHAHINE[1], M. BERNARD[1], N. BERNIER[1], N. CASTELLANI[1], M.-C. CYRILLE[1], N.-P. TRAN[1], R. CRAVERO[3], O. BOURGEOIS[3], V.M. GIORDANO[4], J.-Y. RATY[1,5], F. D'ACAPITO[6], D. BENOIT[2], F. HIPPERT[7], P. NOÉ[1], [1]Univ. Grenoble Alpes, CEA, LETI, Grenoble, France; [2]STMicroelectronics, Crolles, France; [3]Univ. Grenoble Alpes, CNRS, Grenoble INP, Institut Néel, Grenoble, France; [4]ILM, UMR5306 Université Lyon 1-CNRS, Villeurbanne, France; [5]Physics of Solids Interfaces and Nanostructures, B5, Université de Liège, Sart-Tilman, Belgium; [6]CNR-IOM-OGG c/o ESRF - The European Synchrotron, Grenoble, France; [7]Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France

FH-1.1:L12 **Thermal Engineering Targeting Low Power Consumption for Next Generation Phase-change Memory**
C. DE CAMARET, Y. LE-FRIEC, STMicroelectronics, Crolles, France; G. BOURGEOIS, O. CUETO, V. MELI, V. BEUGIN, N. CASTELLANI, M.C. CYRILLE, F. ANDRIEU, J. ARCAMONE, G. NAVARRO, CEA-LETI, Grenoble, France

FH-1.1:L13 **Overcoming the Thermal Stability Limit of Chalcogenide Phase-change Materials for High-temperature Applications**
M. TOMELLERI[1,2], F. HIPPERT[3], A. ALBANESE[1], F. D'ACAPITO[4], T. FARJOT[1], C. SABBIONE[1], M. TESSAIRE[1], D. TEREBENEC[1], N. CASTELLANI[1], V.M. GIORDANO[5], D. BENOIT[2], P. NOÉ[1], [1]Univ. Grenoble Alpes, CEA, LETI, Grenoble, France; [2]STMicroelectronics, Crolles, France; [3]Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; [4]CNR-IOM-OGG c/o ESRF - The European Synchrotron, Grenoble, France; [5]ILM, UMR 5306 Univ. Lyon 1-CNRS, Villeurbanne, France

FH-1.1:L14 **A Novel Sb2Te3/Ge2Sb2Te5/Ge Heterostructure with Enhanced Stability for PCM Application**
A. DIAZ FATTORINI, F. DE NICOLA, M. BERTELLI, S. DE SIMONE, V. MUSSI, M. LONGO, **R. CALARCO**, CNR-IMM Unit of Rome, Rome, Italy; G. D'ARRIGO, I. LOPEZ GARCIA, G. MAIDA, S.M.S. PRIVITERA, CNR-IMM Headquarters, Catania, Italy; M. BORGHI, A. REDAELLI, STMicroelectronics, Agrate B.za (MB), Italy; M.-C. CYRILLE, CEA, LETI, Univ. Grenoble Alpes, Grenoble, France

Session FH-1.2

Resistance switching memories and advanced memristive devices

FH-1.2:IL01 **Memristors for Artificial Neural Networks: From Device Compact Modelling to Circuit and System Level Simulations**
F.L. AGUIRRE, Universitat Autònoma de Barcelona, Spain

FH-1.2:IL02 **Evaluation Framework Assessing Memristor Technologies for Neural Network Implementations**
G. BERSUKER, J. FARMER, M. LUENGO-KOVAC, D. VEKSLER, The Aerospace Corporation, Los Angeles, USA; D.Z. GAO, A.-M. EL-SAYED, T. DURRANT, A. SHLUGER, Nanolayers Research Computing LTD, London, UK; T. RUECKES, L. CLEVELAND, H. LUAN, R. SEN, Nantero Inc., Woburn, USA

FH-1.2:L03 **Resistive Switching in Sputtered MoS2 Memristive Devices**
A. LINKENHEIL[1,3], T. SCHELER[2,3], S. PARK[1,3], P. SCHAAF[2,3], F. SCHWIERZ[1], M. ZIEGLER[1,3], [1]Micro- and Nanoelectronic Systems, Department of Electrical Engineering and Information Technology, TU Ilmenau, Ilmenau, Germany; [2]Materials for Electrical Engineering and Electronics, Department of Electrical Engineering and Information Technology, TU Ilmenau, Ilmenau, Germany; [3]Institute of Micro- and Nanotechnologies MacroNano®, TU Ilmenau, Ilmenau, Germany

FH-1.2:L04 **Resistive Switching Behavior of Lateral TMDC Devices**
Z. GENG[1], C. ZHANG[1], S. PARK[1], C. ZIEBOLD[1], S. SHARMA[1], **F. SCHWIERZ**[1], K. ROSSNAGEL[2], M. ZIEGLER[1], [1]Micro- and Nanoelectronic Systems, Department of Electrical Engineering and Information Technology, Technische Universität Ilmenau, Germany; [2]Institute of Experimental and Applied Physics, Kiel University, Germany, and Ruprecht Haensel Laboratory, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

FH-1.2:L05 **Multiple Physical Time Scales in Few-nanometers Sized Graphene-SiOx-graphene Memristors**
L. PÓSA, Department of Physics, Budapest University of Technology and Economics and MTA-BME Condensed Matter Research Group, Budapest, Hungary, Institute for Technical Physics and Materials Science, Centre for Energy Research, Budapest, Hungary; T. TÖRÖK, G. FEHÉRVÁRI, Z. BALOGH, A. HALBRITTER, Department of Physics, Budapest University of Technology and Economics and MTA-BME Condensed Matter Research Group, Budapest, Hungary

FH-1.2:IL06 **The Role of Materials Design for the Transition from Digital to Analog Memories**
L. ALFF, Institute of Materials Science, Technische Universität Darmstadt, Darmstadt, Germany

FH-1.2:L07 **Oxygen Engineering in Yttrium Oxide-based RRAM Devices: Suppressed Noise, Digital-to-Analog Switching Transition and Conductance Quantization for NVM, Multibit and Neuromorphic Applications**
E. PIROS[1], S. PETZOLD[1], R. EILHARDT[2], A. ZINTLER[2], M. LONSKY[3], N. KAISER[1], T. VOGEL[1], E. JALAGUIER[4], E. NOLOT[4], C. CHARPIN[4], C. WENGER[5], J. MÜLLER[3], E. MIRANDA[6], L. MOLINA-LUNA[2], L. ALFF[1], [1]Advanced Thin Film Technology, Institute of Materials Science, Technische Universität Darmstadt, Darmstadt, Germany; [2]Institute of Physics, Goethe-University Frankfurt, Frankfurt am Main, Germany; [3]Advanced Electron Microscopy Division, Institute of Materials Science, Technische Universität Darmstadt, Darmstadt, Germany; [4]CEA, LETI, Grenoble, France; [5]IHP, Leibniz-Institut fuer innovative Mikroelektronik, Frankfurt (Oder), Germany; [6]Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona, Cerdanyola del Valles, Barcelona, Spain

FH-1.2:L08 **Substoichiometric Hafnium Oxide Polymorphs with Semiconducting Properties**
N. KAISER[1], T. VOGEL[1], A. ZINTLER[2], S. PETZOLD[1], A. ARZUMANOV[1], E. PIROS[1], R. EILHARDT[2], L. MOLINA-LUNA[2], L. ALFF[1], [1]Advanced Thin Film Technology Division, Institute of Materials Science, TU Darmstadt, Darmstadt, Germany; [2]Advanced Electron Microscopy Division, Institute of Materials Science, TU Darmstadt, Darmstadt, Germany

FH-1.2:L09 **Statistical Evaluation of Tailored Memristive Characteristics in TiOx-HfOx Bilayer System**
S. PARK, **C. ZIEBOLD**, S. KLETT, T. IVANOV, M. ZIEGLER, Department of Electrical Engineering and Information Technology, & Institute of Micro and Nanotechnologies MacroNano, TU Ilmenau, Germany

FH-1.2:L10 **Improving Functional Properties of Embedded Ta/TaOx/Pt Based Resistive Memory Devices via Nanopatterning of Bottom Electrode**
M. ZHUK, A. CHOUPRIK, D. KUZMICHEV, A. ZENKEVICH, Moscow Institute of Physics and Technology (National Research University), Dolgoprudny, Moscow region, Russia

FH-1.2:L11 **Selective Activation of Memristive Interfaces in TaOx-based Devices by Controlling Oxygen Vacancies Dynamics at the Nanoscale**
M.J. SÁNCHEZ[1], C. FERREYRA[2], M. AGUIRRE[3,4,5], C. ACHA[6], S. BENGIÓ[2], J. LECOURT[7], U. LUDERS[7], D. RUBI[2], [1]INN-Centro Atómico Bariloche and Instituto Balseiro, San Carlos de Bariloche, Argentina; [2]GlyA and INN-CONICET, CNEA, San Martín, Buenos Aires, Argentina.2INN-CONICET; [3]Depto de Fíisica de Materia Condensada, Universidad de Zaragoza, Zaragoza, Spain; [4]Lab. de Microscopías Avanzada (LMA), Instituto de Nanociencia de Aragón (INA)-Universidad de Zaragoza, Zaragoza, Spain; [5]Instituto de Ciencias de Materiales de Aragón (ICMA), Universidad de Zaragoza, Zaragoza, Spain; [6]Depto. de Física, FCEyN, Universidad de Buenos Aires and IFIBA,UBA-CONICET, Pab I, Ciudad Universitaria, Buenos Aires, Argentina.; [7]CRISMAT, CNRS UMR 6508, ENSICAEN, Caen, France

FH-1.2:L12 **Investigation of the Ultrafast Resistive Switching**
B. SANTA, D. MOLNÁR, A. HALBRITTER, Budapest University of Technology and Economics and MTA-BME Condensed Matter Research Group, Budapest, Hungary; M. CSONTOS, Empa, Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland

FH-1.2:IL13 **Oxide ReRAM Technology NVM Solution**
A. REGEV, Weebit-nano, Hod Hasharon, Israel

FH-1.2:IL14 **Structural Changes and Conductive Filament Formation in Silicon Oxide during Resistance Switching**
A.J. KENYON[1], A. MEHONIC[1], M. BUCKWELL[1], L. MONTESI[1], M. SINGH MUNDE[1,2], D. GAO[3], S. HUDZIAK[1], R.J CHATER[4], S. FEARN[4], D. MCPHAIL[4], M. BOSMAN[2], A.L. SHLUGER[3], [1]Department of Electronic & Electrical Engineering, UCL, London, UK; [2]Institute of Materials Research and Engineering, Singapore; [3]Department of Physics and Astronomy and London Centre for Nanotechnology, University College London, London, UK; [4]Department of Materials, Imperial College London, South Kensington Campus, London, UK

FH-1.2:IL15 **Prospects and Challenges of Area-dependent Memristive Devices for Neuromorphic Computing**
R. DITTMANN, Peter-Grünberg-Institute (PGI-7), Research Center Jülich, Jülich, Germany

FH-1.2:L16 **Memristor-based Artificial Neural Network (ANN) Hardware based on Flexible Semiconducting Technology**
A. KIAZADEH, J. DEUERMEIER, M. PEREIRA, R. MARTINS, E. FORTUNATO, i3N/CENIMAT, Department of Materials Science, NOVA School of Science and Technology, Universidade NOVA de Lisboa and CEMOP/UNINOVA, Campus de Caparica, Portugal

FH-1.2:L17 **Advanced Analysis of Current Noise in SiOx-based Phase-change Memories**
Z. BALOGH, A. HALBRITTER, Dept. of Physics, Budapest University of Technology and Economics, and MTA-BME Condensed Matter Research Group, Budapest, Hungary; P. BALÁZS, D. KRISZTIÁN, G. FEHÉRVÁRI, Dept. of Physics, Budapest University of Technology and Economics, Budapest, Hungary; L. PÓSA, Dept. of Physics, Budapest University of Technology and Economics, Budapest, Hungary and Institute for Technical Physics and Materials Science, Centre for Energy Research, Hungarian Academy of Sciences, Budapest, Hungary

FH-1.2:IL18 **Reliability of Redox-based Memristive Elements**
R. WASER[1,2], D. WOUTERS[1], S. MENZEL[2], [1]JARA-FIT & IWE2, RWTH Aachen University, Aachen, Germany; [2]JARA-FIT & PGI-7/-10, Forschungszentrum Jülich, Jülich, Germany

FH-1.2:IL19 **Analog Behavior in Programmable Metallization Cell Devices**
N. CHAMELE, M. BALABAN, A. RICKS, Y. GONZALEZ VELO, **M.N. KOZICKI**, School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ, USA

FH-1.2:L20 **Influence of Different SiO2 Matrices on the Properties of Cu/SiO2/W Devices**
F. MAUDET[1], H. AMARI[2], D. MARLINA[1,3], V. DESHPANDE[1], C. DUBOURDIEU[1,3], [1]Institute Functional Oxides for Energy-Efficient Information Technology (QM-IFOX), Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin, Germany; [2]Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany; [3]Freie Universität Berlin, Physical Chemistry, Berlin Germany

FH-1.2:IL21 **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-1.2:L22 **Swift Heavy Ion Irradiation Induced Effects on Emerging Memories - Correlation of Structural and Electrical Properties**
T. VOGEL[1], T. KÄMPFE[2], A.L. SERRA[3], N. KAISER[1], M. LEDERER[2], G. LEFÈVRE[3], N. GUILLAUME[3], R. OLIVO[2], T. ALI[2], D. LEHNINGER[2], E. PIROS[1], G. NAVARRO[3], C. CHARPIN-NICOLLE[3], S. PETZOLD[1], C. TRAUTMANN[4], L. ALFF[1], [1]Advanced Thin Film Technology Division, Institute of Materials Science, TU Darmstadt, Darmstadt, Germany; [2]Fraunhofer IPMS, Dresden, Germany; [3]CEA LETI, Grenoble, France; [4]GSI Helmholtzzentrum, Darmstadt, Germany & Institute of Materials Science, TU Darmstadt, Darmstadt, Germany

FH-1.2:L23 **Quantum Transport Phenomena in Transition Metal Oxide Memristors**
T.N. TÖRÖK, P. MAKK, A. HALBRITTER, Department of Physics, Budapest University of Technology and Economics, Budapest, Hungary; M. CSONTOS, Empa, Swiss Federal Laboratories for Materials Science and Technology, Transport at Nanoscale Interfaces Laboratory, Switzerland

Session FH-2

Magnetic and ferroelectric memories: materials, devices and applications

FH-2:IL01 **Magneto-ionics: using Ionic Motion to Control Magnetism in Spintronics Devices**
L. HERRERA DIEZ, CNRS - Université Paris-Saclay, Palaiseau, France

FH-2:IL02 **A Multifunctional Standardized Magnetic Tunnel Junction Stack Embedding Sensor, Memory and Oscillator Functionalities**
I.L. PREJBEANU[1], A. CHAVENT[1], V. IURCHUK[1], L.TILLIE[1], Y. BEL[1], N. LAMARD[1], L. VILA[1], U. EBELS[1], R.C. SOUSA[1], B. DIENY[1], G. DI PENDINA[1], G. PRENAT[1], J. LANGER[2], J. WRONA[2], [1]Univ. Grenoble Alpes, CEA, CNRS, Grenoble INP*, IRIG-Spintec, Grenoble, France, *Institute of Engineering, Univ. Grenoble Alpes; [2]Singulus Technologies AG, Kahl am Main, Germany

FH-2:IL03 **New Insight of Degradation and TDDB of Super-thin MgO in STT-MRAM**
KIN-LEONG PEY, J.H. LIM, N. RAGHAVAN, Singapore University of Technology and Design, Singapore

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 University, Mugla, Turkey; M. ACET, M. FARLE, Physics, Duisburg-Essen University, Duisburg, Germany

FH-2:IL05 **In-memory Computing with Ferroelectric Germanium Telluride**
C. RINALDI, L. NESSI, F. FAGIANI, M. CANTONI, R. BERTACCO, Politecnico di Milano, Milano, Italy; S. VAROTTO, M. BIBES, CNRS, Thales, Palaiseau, France; S. CECCHI, Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany; R. CALARCO, CNR-IMM, Roma, Italy; J. SŁAWINSKA, University of Groningen, Groningen, Netherlands; M. BUONGIORNO NARDELLI, University of North Texas, Denton, TX, USA; S. PICOZZI, CNR-SPIN, Chieti, Italy; P. NOËL, J.-P. ATTANÉ, L. VILA, Université Grenoble Alpes, CEA, CNRS, Grenoble, France

FH-2:IL06 **Resistive Switching in Ferroelectric Perovskites**
I. FINA, Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, Bellaterra, Catalonia, Barcelona, Spain

FH-2:IL07 **Hafnia-based Ferroelectric Devices: A Singular Type of Switching**
P. NUKALA[1, 2], D. CARBONE[3], M. AHMADI[1], Y. WEI[1, 4], S. MATZEN[5], **B. NOHEDA**[1, 6], [1]Zernike Institute for Advanced Materials, University of Groningen, Groningen, The Netherlands; [2]Center for Nanoscience and Engineering, Indian Institute of Science, Bengaluru, India; [3]MAX IV Laboratory, Lund University, Lund, Sweden; [4]Nanoelectronic Devices Laboratory (NANOLAB), École Polytechnique Fédérale de Lausanne, EPFL, Lausanne, Switzerland; [5]Center for Nanoscience and Nanotechnology, University Paris-Saclay, CNRS, Palaiseau, France; [6]CogniGron Centre, University of Groningen, Groningen, The Netherlands

FH-2:IL08 **Fluid Imprint in Ferroelectric La:HfO2 Capacitors**
A. GRUVERMAN[1], P. BURAGOHAIN[1], A. ERICKSON[2], T. MITTMANN[3], P. KARIUKI[3], C. RICHTER[3], T. SCHENK[4], T. MIKOLAJICK[3], U. SCHROEDER[3], [1]Dept. of Physics and Astronomy, University of Nebraska, Lincoln, NE, USA; [2]Dept. of Mechanical and Materials Engineering, University of Nebraska, Lincoln, NE, USA; [3]NaMLab gGmbH/TU Dresden, Dresden, Germany; [4]Materials Research and Technology Department, Luxembourg Institute of Science and Technology, Belvaux, Luxembourg

FH-2:L09 **HZO FTJ Analog NVM with Synaptic Plasticity**
N. SIANNAS, C. ZACHARAKI, P. TSIPAS, **A. DIMOULAS**, NCSR DEMOKRITOS, Athens, Greece

FH-2:L10 **Flexible HfO2-based Ferroelectric Tunnel Memristor on Mica**
I. MARGOLIN, A. CHOUPRIK, R. KIRTAEV, E. KOROSTYLEV, V. MIKHEEV, E. GUBERNA, D. NEGROV, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow Region, Russia

FH-2:L11 **Ferroelectric Devices on CAAC-OSLSI**
S. NUMATA, Y. EGI, F. ISAKA, Y. JIMBO, T. HAMADA, H. BABA, K. OHSHIMA, T. MURAKAWA, S. TEZUKA, H. KUNITAKE, S. YAMAZAKI, Semiconductor Energy Laboratory, Co, Ltd., Atsugi-shi, Kanagawa, Japan

FH-2:L12 **Evaluation of Ferroelectric Memory using CAAC-OSLSI Technology**
K. OHSHIMA, K. FURUTANI, T. MATSUZAKI, K. TSUDA, S. NUMATA, F. ISAKA, Y. JIMBO, H. KUNITAKE, T. ONUKI, S. YAMAZAKI, Semiconductor Energy Laboratory Co., Ltd., Atsugi-shi, Kanagawa, Japan

Session FH-3

Emerging applications for non-volatile memories and memristive devices

FH-3:IL01 **Ferroelectric Memories for Neuromorphic Computing**
S. SLESAZECK, NaMLab gGmbH, Dresden, Germany

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

FH-3:IL03 **Spintronic Devices for Neuromorphic and Probabilistic Computing**
SHUNSUKE FUKAMI, Research Institute of Electrical Communication, Tohoku University, Sendai, Japan

FH-3:IL04 **Organic Spintronic Multilevel Resistive Switching Devices as Synapses for Neuromorphic Computing**
A. RIMINUCCI, CNR-ISMN, Bologna, Italy

FH-3:L05 **Spin-computing Devices for Edge Artificial Intelligence**
R. BERTACCO, Dipartimento di Fisica, Politecnico di Milano, Milano, Italy

FH-3:IL06 **Memory-based Neuromorphic Hardware for Advanced Neural Network Models**
D.B. STRUKOV, University of California Santa Barbara, Santa Barbara, CA, USA

FH-3:IL07 **Neuromorphic Computing with Redox-based Memristive Elements - Capacitive and Resistive Concepts**
T. ZIEGLER, D.J. WOUTERS, R. WASER, JARA-FIT and IWE2, RWTH Aachen University, Aachen, Germany; S. MENZEL, R. WASER, JARA-FIT and PGI-7/-10, Forschungszentrum Jülich GmbH, Jülich, Germany

FH-3:L08 **Nonlinear Dynamics of Chua's Circuits with Physical Memristor Model**
F. CORINTO, Politecnico di Torino, Torino, Italy; M. DI MARCO, M. FORTI, R. MORETTI, L. PANCIONI, University of Siena, Siena, Italy

FH-3:L09 **Resistive Switching-based Invariant Manifold Tunable Chua's Circuit Design**
M. ESCUDERO[1], L. PANCIONI[2], S. SPIGA[1], S. BRIVIO[1], [1]CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy; [2]Università degli Studi di Siena, Siena, Italy

FH-3:L10 **Storing and Retrieving Data in Mem-Processors**
A. ASCOLI[1], R. TETZLAFF[1], I. MESSARIS[1], S.-M. KANG[2], L.O. CHUA[3], [1]Faculty of Electrical and Computer Engineering, Technische Universitat Dresden, Dresden, Germany; [2]Jack Baskin School of Engineering, University of California Santa Cruz, Santa Cruz, CA, USA; [3]Dept. of Electrical Engineering and Computer Sciences, University of California Berkeley, Berkeley, CA, USA

FH-3:L11 **Autonomous Decision Making in Noisy Environment**
D. MOLNAR, T.N. TÖRÖK, L. PÓSA, A. HALBRITTER, Department of Physics, Budapest University of Technology and Economics and MTA-BME Condensed Matter Research Group, Budapest, Hungary

FH-1:IL12 **From Resistive Switching in Mott Insulators to Mott Memory and Artificial Neuron**
E. JANOD, B. CORRAZE, J. TRANCHANT, L. CARIO, **M.-P. BESLAND**, Nantes University, UMR CNRS, Institut des Matériaux Jean Rouxel (IMN), Nantes, France

FH-3:IL13 **VO2 Metal-insulator Devices for Energy Efficient Neuromorphic Computing**
S. KARG, E. CORTI, O. MAHER, IBM Research, Zurich, Switzerland

FH-3:L14 **Innovative V2O3:Cr Mott Insulator-based Resistive Memory**
L. LABORIE, N. CASTELLANI, G. BOURGEOIS, C. CASTELLANA, T. MAGIS, E. NOWAK, G. MOLAS, E. JALAGUIER, CEA, LETI, Univ. Grenoble Alpes, Grenoble, France; G. LEFEVRE, S. DAVID, C. VALLÉE, Univ. Grenoble Alpes, CNRS, CEA-LETI Minatec, LTM, Grenoble, France; J. TRANCHANT, B. CORRAZE, M.-P. BESLAND, E. JANOD, L. CARIO, Université de Nantes, CNRS, Institut des Matériaux Jean Rouxel, IMN, Nantes, France

FH-3:L15 **Silicon-integrated La2NiO4+δ-Based Valence-change Memristive Devices with Neuromorphic Programming Capabilities**
KHANH KHUU, C. JIMENEZ, M. BURRIEL, Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; G. LEFÈVRE, A. BSIESY, Univ. Grenoble Alpes, CNRS, CEA/LETI Minatec, LTM, Grenoble, France; S. BLONKOWSKI, E. JALAGUIER, Univ. Grenoble Alpes, CEA, LETI, Grenoble, France

FH-3:IL16 **Oscillator Computing based on Memristive Devices**
C. Lenk, L. Seeber, S. Durstewitz, S. Park, T. Ivanov, **M. ZIEGLER**, Micro- and Nanoelectronic Systems, Electrical Engineering and Information Technology, Ilmenau University of Technology, Ilmenau, Germany

FH-3:L17 **Implementation of an Electrical Set-up to enable RRAM-based Neural Network Operations**
E. PEREZ-BOSCH QUESADA, E. PEREZ, M. KALISHETTYHALLI MAHADEVAIAH, C.A. CHAVARIN, 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, BTU Cottbus-Senftenberg, Cottbus, Germany

FH-3:IL18 **Nanowire based Memristive Devices**
G. MILANO, **C. RICCIARDI**, Advanced Materials Metrology and Life Science Division, INRiM (Istituto Nazionale di Ricerca Metrologica), Torino, Italy; Department of Applied Science and Technology, Politecnico di Torino, Torino, Italy

FH-3:L19 **A Graph Theory-based Approach for Memristive Nanowire Networks**
G. MILANO[1], K. MONTANO[2], E. MIRANDA[3], C. RICCIARDI[2], [1]Advanced Materials Metrology and Life Science Division, INRiM (Istituto Nazionale di Ricerca Metrologica), Torino, Italy; [2]Department of Applied Science and Technology, Politecnico di Torino, Torino, Italy; [3]Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona (UAB), Cerdanyola del Valles, Spain

FH-3:L20 **Long-term Probing of Memristive Ag-based Nanostructures via an Unconventional cAFM Approach**
N. CARSTEN, R. GUPTA, T. STRUNSKUS, F. FAUPEL, A. VAHL, Institute for Materials Science, Chair for Multicomponent Materials, Kiel University, Kiel, Germany; A. HASSANIEN, Department of Condensed Matter Physics, J. Stefan Institut, Ljubljana, Slovenia

FH-3:L21 **Resistive Switching in Nanoparticle-based Systems: From Diffusive Switching towards Collective Dynamics**
N. CARSTENS[1], B. ADEJUBE[1], M. NOLL[2], T. BIRKOBEN[2], M. MIRIGLIANO[3], R. GUPTA[1], T. STRUNSKUS[1], F. FAUPEL[1], P. MILANI[3], H. KOHLSTEDT[2], **A. VAHL**[1], [1]Institute for Materials Science - Chair for Multicomponent Materials, Faculty of Engineering, Kiel University, Kiel, Germany; [2]Institute for Electrical Engineering and Information Engineering - Chair for Nanoelectronics, Faculty of Engineering, Kiel University, Kiel, Germany; [3]Dipartimento di Fisica & Cimaina, Universita degli Studi di Milano, Milano, Italy

FH-3:L22 **Correlation between the Threshold Kinetics and Relaxation Behavior of Ag/HfO2-based Diffusive Memristors**
S.A. CHEKOL, S. MENZEL, R. WASER, S. HOFFMANN-EIFERT; W.R. AHMAD, R. WASER, JARA-FIT and Peter Gruenberg Institute (PGI 7 & 10), Forschungszentrum Juelich GmbH, Juelich, Germany; JARA-FIT and Institute of Materials in Electrical Engineering and Information Technology II, RWTH Aachen University, Aachen, Germany

FH-3:L23 **Short Time Dynamics in SiO2 and HfO2-based Threshold Switching Devices**
M. DUTTA, S. BRIVIO, M. ALIA, S. SPIGA, CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy

FH-3:L24 **Voltage-time Dilemma of Current-driven Silver Single-atom Resistive Switches**
A. NYARY, B. SÁNTA, A. HALBRITTER, Budapest University of Technology and Economics, MTA-BME Condensed Matter Research Group, Budapest, Hungary

FH-3:IL25 **Physic Based Simulation of ReRAM for Neural Network Applications**
S. MENZEL, Forschungszentrum Jülich, Peter Grünberg Institut (PGI-7), Jülich, Germany

FH-3:IL26 **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:L27 **Impact of Memristive Switching Dynamics on Spiking Neural Network Operation**
S. BRIVIO, S. SPIGA, CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy; D.R.B. LY, E. VIANELLO, Université Grenoble Alpes, Leti, Grenoble, France

FH-3:L28 **Modelling the Switching of RRAM Devices for Bio-inspired Computing**
F. VACCARO, S. BRIVIO, S. SPIGA, CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy; S. PEROTTO, Dipartimento di Matematica, Politecnico di Milano, Milano, Italy; A.G. MAURI

FH-3:L29 **A Comprehensive Stochastic Modeling for the Effect of Cu Ions and Oxygen Vacancies in Cu/ZnO/Pt RRAM**
KUAN YANG, Mathematical Institute, University of Oxford & Cuiying Honors College, Lanzhou University; S. ZHOU, School of Arts, Lanzhou University; J. CHEN, School of Mechanical Engineering, University of Leeds, Leeds, UK; J. HU, J. QI, Key Laboratory of Special Function Materials and Structure Design, Ministry of Education, School of Physical Science and Technology, Lanzhou University, Lanzhou, China

FH-3:L30 **1/f Noise Spectroscopy and Noise Tailoring of Resistive Switching Devices**
A. HALBRITTER, Z. BALOGH, B. SÁNTA, L. PÓSA, T.N. TÖRÖK, D. MOLNÁR, Department of Physics and MTA-BME Condensed Matter Research Group, Budapest University of Technology and Economics, Budapest, Hungary; M. CSONTOS, Transport at Nanoscale Interfaces Laboratory, Empa, Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland

FH-3:L31 **A Metal-Oxide-Based Memristor for Artificial Synapse**
N. RAEIS-HOSSEINI, C. PAPAVASSILIOU, Imperial College London, London, UK

SYMPOSIUM FI

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

Session FI-1

General physical and chemical properties, structural and electronic characterization of graphene, graphene oxide and of single and few-layered 2D compounds

FI-1:IL01 **Nanometer-scale Characterization and Control of Two-dimensional Materials with Atomic Force Microscopy**
M.R. ROSENBERGER, University of Notre Dame, Notre Dame, IN, USA

FI-1:IL02 **Two-dimensional Topological Polymers**
T.-J. LIU, M. SPRINGER, A. KUC, Y. JING, **T. HEINE**, TU Dresden, Dresden, Germany

FI-1:IL03 **In situ Transmission Electron Microscopy of 2D Nanomaterials**
D.V. GOLBERG, Queensland University of Technology (QLD), Brisbane, Australia

FI-1:IL04 **Quantum Hall Effect in Graphite Films**
A. MISHCHENKO, Department of Physics and Astronomy, The University of Manchester, Manchester, UK

FI-1:IL05 **Advances in Organic 2D Crystals**
XINLIANG FENG, Center for Advancing Electronics Dresden & Faculty of Chemistry and Food Chemistry, Technische Universitaet Dresden, Germany

FI-1:IL06 **2D MXene Organic Dispersions and their Electronic Applications**
CHONG MIN KOO, Materials Architecturing Research Center, Korea Institute of Science and Technology, Seoul, South Korea

FI-1:L07 **Mechanical Strain in Silicene Membranes**
C. MASSETTI[2], C. MARTELLA[1], D.S. DHUNGANA[1], C. GRAZIANETTI[1], A. MOLLE[1], E. BONERA[2], [1]CNR-IMM Agrate Brianza unit, Agrate Brianza (MB), Italy; [2]Università Milano-Bicocca, Milano, Italy

FI-1:L08 **Electronic Properties in MOCVD Mono- and Bilayer MoS2 on CVD Single-layer Graphene on Alpha-Al2O3 (0001) at Atomic Resolution**
H. WÖRDENWEBER[1, 2], S. KARTHÄUSER[1], A. GRUNDMANN[3], Z. WANG[1, 2], H. KALISCH[3], A. VESCAN[3], M. HEUKEN[3, 4], R. WASER[1, 2], S. HOFFMANN-EIFERT[1], [1]Peter Grünberg Institute 7&10, Forschungszentrum Jülich GmbH and JARA-FIT, Jülich, Germany; [2]RWTH Aachen University, Aachen, Germany; [3]Compound Semiconductor Technology, RWTH Aachen University, Aachen, Germany; [4]AIXTRON SE, Herzogenrath, Germany

FI-1:L09 **New Way of Conceiving the Structure of Graphene**
J. NIEWIADOMSKA-KAPLAR, Scientific Publishing House Tab, Rome, Italy

Session FI-2

Novel properties including spin, spin-orbit, magnetic, superconducting, thermal, thermoelectric, piezoelectric, excitonic, catalysis-related etc.

FI-2:IL01 **Synthesis and Novel Properties of 2D Layered Semiconductors and their Heterostructures**
WEN-HAO CHANG, Department of Electrophysics, National Chiao Tung Unversity, 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:L03 **A Place where Everyone Matters – Interfaces in 2D Functional Nanostructures**
M. BAR SADAN, Ben Gurion University, Beer Sheva, Israel

FI-2:IL04 **Revisiting the Buckling Metrology Method to Determine the Young's Modulus of 2D Materials**
R. FRISENDA, A. CASTELLANOS GOMEZ, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC), Madrid, Spain

FI-2:IL05 **Ferroelectric Domains and Networks of Piezoelectric Domains in Twistronic Bilayers of Transition Metal Dichalcogenides (TMD)**
V. FALKO, National Graphene Institute, University of Manchester, Manchester, UK

FI-2:L06 **Phase Transition and Catalytic Activity toward Hydrogen Evolution Reaction of Mo1−xM'xSe2 Alloy Nanosheets**
T.T. DEBELA, **HONG SEOK KANG**, Institute for Application of Advanced Materials, Jeonju University, South Korea; Department of Nano & Advanced Materials, Jeonju University, South Korea

FI-2:IL07 **Functionalizing 2D-layered Nanomaterials for Artificial Photosynthesis: Turning CO2 into a Valuable Resource**
LI-CHYONG CHEN[1,2], I. SHOWN[3], YI-FAN HUANG[3], HE-YUN DU[1,2], HSIANG-TING LIEN[1,2], YU-CHUNG CHANG[1], KUEI-HSIEN CHEN[1,3], [1]Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan; [2]Center of Atomic Initiative for New Materials, National Taiwan University, Taipei, Taiwan; [3]Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan

FI-2:IL08 **Josephson Junctions for Digital Applications**
P. FEBVRE, Université Savoie Mont Blanc, Le Bourget du Lac, France

FI-2:L09 **2D Materials Beyond Graphene**
Y. GOGOTSI, C.E. SHUCK, A.J. Drexel Nanomaterials Institute, Drexel University, Philadelphia, PA, USA

Session FI-3

Synthesis, processing and microstructure of graphene and other 2D layered compounds and their composites

FI-3:IL01 **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:IL02 **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; T. LIVNEH, Nuclear Research Center, Negev, Israel; I. KAPLAN-ASHIRI, Weizmann Institute of Science, Israel; Y. ZHANG, Max Planck Institute for Solid State Research, Stuttgart, Germany; Y. IWASA, The University of Tokyo, Japan; V. BRUSER, Leibnitz Institute of Plasma, Germany; A. DI BARTOLOMEO, University of Salerno, Italy

FI-3:L03 **Boron Nitride Nanosheets from a New Source of Large hBN Single Crystals**
B. TOURY[1], C. MAESTRE[1, 2], V. GARNIER[2], P. STEYER[2], C. JOURNET[1], [1]Laboratoire des Multimatériaux et Interfaces, CNRS, UMR 5615, Université de Lyon, Villeurbanne, France; [2]Laboratoire Matériaux Ingénierie et Science, UMR CNRS 5510, INSA de Lyon, Villeurbanne, France

FI-3:IL04 **2D High-Entropy MXenes**
S.K. NEMANI, B. ZHANG, B.C. WYATT, **B. ANASORI**, Department of Mechanical and Energy Engineering, and Integrated Nanosystems Development Institute, Purdue School of Engineering and Technology, Indiana University-Purdue University Indianapolis, Indianapolis, IN, USA

FI-3:IL05 **2D Materials: Inorganic Nanotubes and Fullerene-like Nanoparticles, an Update**
R. TENNE, Weizmann Institute of Science, Rehovot, Israel

FI-3:L06 **Two-dimensional MXenes with 5 Atomic Layers of Transition Metals: Mo4VC4Tx and Beyond**
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:IL07 **Thickness and Lateral Engineering of 2D Materials**
L. CAMILLI, Department of Physics, University of Rome "Tor Vergata", Rome, Italy

FI-3:L08 **Sustainable and Scalable Liquid-phase Exfoliation of Graphene-like Materials with Nontoxic Polarclean Solvent**
J. DE SANTIS[1], V. PAOLUCCI[1], G. DI IORIO[1], A. POLITANO[2], C. CANTALINI[1], [1]Department of Industrial and Information Engineering and Economics, University of L'Aquila, Italy; [2]Department of Physical and Chemical Sciences, University of L'Aquila, Italy

Session FI-4

Integration processes of graphene and other 2D layered materials in devices structures

FI-4:IL01 **Precise Synthesis of 2D Crystals for Energy Applications**
C. MATTEVI, Imperial College London, Department of Materials, London, UK

FI-4:IL02 **Graphene for Waveguide-integrated Optoelectronics**
C. COLETTI, Center for Nanotechnology Innovation @ NEST, Istituto Italiano di Tecnologia, Pisa, Italy; Graphene Labs, Istituto Italiano di Tecnologia, Genova, Italy

FI-4:IL03 **Integration Processes of Graphene-based Van der Waals Heterostructures and their Terahertz Device Applications**
J.A. DELGADO-NOTARIO, CENTERA Laboratories, Institute of High Pressure Physics, Polish Academy of Sciences, Warsaw, Poland

FI-4:IL04 **Heteroassembly of Colloidal Graphene and Titania nanoseets and their Applications**
XINGKE CAI[1], Z. LU[2], Z. JIAN[3], R. MA[4], T. SASAKI[4], [1]Institute for Advanced Study, Shenzhen University, Shenzhen, Guangdong, China; [2]Shenzhen Institutes of Advanced Technology, CAS, Shenzhen, China; [3]Department of Materials Science and Engineering, Wuhan University of Technology, Wuhan, China; [4]International 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 WS2 Nanostructures: Optical Properties and Interaction with Hydrogen**
J.A. ALONSO, Dept. of Theoretical, Atomic and Optical Physics, University of Valladolid, Valladolid, Spain; A. ZAK, A. LAIKHTMAN, Physics Department, Faculty of Sciences, Holon Institute of Technlogy, Holon, Israel; J.I. MARTINEZ, ESISNA Group, Institute of Materials Science of Madrid (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 **A High Throughput and Unbiased Machine Learning Approach for Classification of Graphene Dispersions**
MD.J. ABEDIN, T. BARUA, M. SHAIBANI, **M. MAJUMDER**, Department of Mechanical & Aerospace Engineering, Monash University, Clayton, Australia

FI-5:IL04 **From the Atomic Structure to the Optoelectronic Properties Studies of 2D Materials via TEM**
R. ARENAL, Laboratorio Microscopias Avanzadas, U. Zaragoza, Zaragoza, Spain; Fundacion ARAID, Zaragoza, Spain; Instituto de Nanociencia y Materiales de Aragon (INMA), CSIC-U. Zaragoza, Zaragoza, Spain

Session FI-6

Application of graphene and other 2D layered materials and composites

FI-6:IL01 **Synergizing High Capacitance with Fast Charging: Pseudocapacitance in 2D Materials**
M.R. LUKATSKAYA, Department of the Mechanical and Process Engineering, ETH Zürich, Zürich, Switzerland

FI-6:L02 **Graphite Superlubricity Unabled by Triboinduced Nanocontacts**
R. BUZIO, A. GERBI, C. BERNINI, CNR-SPIN, Genova, Italy; L. REPETTO, Department of Physics, Università di Genova, Genova, Italy; A. VANOSSI, International School for Advanced Studies (SISSA) and CNR-IOM, Trieste, Italy

FI-6:L03 **Intercalation of Alkaline-ions in 3D-aeromaterial Consisting of MoS2**
P. HOLTZ, S. HANSEN, R. ADELUNG, Functional Nanomaterials, Department of Materials Science and Engineering, CAU Kiel, Kiel, Germany

FI-6:L04 **Nanotribology of AFM Probes Functionalized by Graphene**
A. GERBI, R. BUZIO, C. BERNINI, CNR-SPIN, Genova, Italy; L. REPETTO, Department of Physics, Università di Genova, Genova, Italy; A. VANOSSI, International School for Advanced Studies (SISSA) and CNR-IOM, Trieste, Italy

FI-6:IL05 **Surface Functionalization of Graphene Derivatives with Aromatic Ligands for Hybrid Nanocomposites with Inorganic Nanoparticles: Special Focus on Ag Nanoparticles Decorated Reduced Graphene Oxide for Thermally Conductive Textiles**
C. INGROSSO, G. MANDRIOTA, A. PANNIELLO, R. COMPARELLI, M. STRICCOLI, CNR-IPCF c/o Dept. of Chemistry, University of Bari, Bari, Italy; R. STRIANI, F. FERRARI, A. GRECO, C. ESPOSITO CORCIONE, Dept. of Innovation Engineering, University of Salento, Lecce, Italy; G.V. BIANCO, CNR-NANOTEC, c/o Dept. of Chemistry, University of Bari, Bari, Italy; A. MILELLA, M.L. CURRI, Dept. of Chemistry, University of Bari, Bari, Italy

FI-6:IL06 **Computational and Experimental Approaches for Printed 2D-based Devices**
G. FIORI, University of Pisa, Dipartimento Ingegneria Informazione, Pisa, Italy

FI-6:L07 **High-performance Flexible Broadband Photodetectors based on 2D Hafnium Selenosulfide Nanosheets**
R.K. ULAGANATHAN[1], R. SANKAR[1,2], F.-C. CHOU[1,3], [1]Center for Condensed Matter Sciences, National Taiwan University Taipei, Taiwan; [2]Institute of Physics, Academia Sinica, Taipei, Taiwan; [3]Taiwan Consortium of Emergent Crystalline Materials, Ministry of Science and Technology, Taipei, Taiwan

FI-6:L08 **Effect of Solvent on Corrosion Behavior of Graphene Oxide Coated AZ31B Magnesium Alloy**
M.F. MAQSOOD[1, 2], S.M. ZAIN MEHDI[3], U. LATIF[2], M.A. RAZA[2], Z.U. REHMAN[2], A. MAQSOOD[4], [1]Faculty of Nanotechnology and Advanced Materials Engineering, Sejong University, Seoul, South Korea; [2]Institute of Metallurgy & Materials Engineering, Faculty of Chemical & Materials Engineering, University of the Punjab, Lahore, Pakistan; [3]Hybrid Materials Centre, Department of Nanotechnology and Advanced Materials Engineering, Sejong University, Seoul, South Korea; [4]The School of Allied Health Sciences, The Children's Hospital & The Institute of Child Health, Lahore, Pakistan

SYMPOSIUM FJ

ADVANCED PHOTOCATALYTIC MATERIALS FOR ENERGY AND CHEMISTRY IN TRANSITION AND FOR THE ENVIRONMENT

Session FJ-1

Design elements and advanced concepts for photofunctional materials

FJ-1:IL01 **Phenomena Affecting the Carbon Dioxide Reduction Activity of Semiconductor Photoelectrodes**
M.T. MAYER, Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin, Germany

FJ-1:IL02 **Dual Synergistic La1-xTixFeO3 Catalyst with Combined Photocatalytic and Photo-CWPO Catalytic Activity Under Visible Light for Water Treatment**
P. GARCÍA-MUÑOZ[1, 2], F. FRESNO[3], D. ROBERT[1], **N. KELLER**[1], [1]Institut de Chimie et Procédés pour l'Energie, l'Environnement et la Santé (ICPEES), CNRS/Strasbourg University, Strasbourg, France; [2]Escuela Técnica Superior de Ingenieros Industrial (ETSII), Universidad Politécnica de Madrid, Madrid, Spain; [3]Photoactivated Processes Unit, IMDEA Energy Institute, Móstoles, Madrid, Spain

FJ-1:IL03 **Nanostructure Design for Solar Water Splitting**
F. CADDEO, Z. DURMUS, B. MAHMOUDI, F. HIMMELSTEIN, D. EBERHART, T. LINDENBERG, H. ZHANG, R. NAUMANN, **A.W. MAIJENBURG**, Center for Innovation Competence SiLi-Nano, Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany

FJ-1:IL04 **How to Compare Photoelectrochemical Properties of TiO2 Polymorphs?**
A. DESWAZIERES, O. DURUPTHY, **C. LABERTY-ROBERT**, Laboratoire de Chimie de la Matière Condensée de Paris - UMR 7574, Sorbonne University, Paris, France

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-1:IL06 **Selective C1 Molecule Conversion for Solar-driven Artificial Carbon Cycle**
YUJIE XIONG, School of Chemistry and Materials Science, University of Science and Technology of China, Hefei, China

FJ-1:L07 **Synthesis, Characterisation and Photocatalytic Activity of Black Titanium Oxide Nanomaterials in Wastewater Treatment**
L. ANDRONIC, Transilvania University of Brasov, Department of Product Design, Mechatronics and Environment, Brasov, Romania

Session FJ-2

Understanding fundaments of photoinduced processes and charge transport

FJ-2:IL01 **Mechanistic Studies of Water Splitting Materials: Relation of Bulk and Surface Processes in Oxide Photoabsorbers**
J.P. HOFMANN, Surface Science Laboratory, Technical University of Darmstadt, Darmstadt, Germany

FJ-2:IL02 **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:IL03 **A Holistic Approach to Model the Kinetics of Photocatalytic Reactions**
J.Z. BLOH, DECHEMA-Forschungsinstitut, Frankfurt, Germany

FJ-1:IL04 **Charge Carriers Dynamics in WO3/BiVO4 Heterojunction Photoanodes**
I. GRIGIONI, M.V. DOZZI, **E. SELLI**, Dipartimento di Chimica, Università degli Studi di Milano, Milano, Italy

FJ-2:IL05 **Antibacterial Properties of Ca2Fe2O5 Brownmillerite for Water Disinfection**
A. ŠUTKA[1], M. VANAGS[1], L. MEZULE[2], [1]Institute of Materials and Surface Engineering, Faculty of Materials Science and Applied Chemistry, Riga Technical University, Riga, Latvia; [2]Water Research and Environmental Biotehnology Laboratory, Faculty of Civil Engineering, Riga Technical University, Riga, Latvia

FJ-2:IL06 **Quantifying Charge Transport and Recombination in Photoelectrodes**
P. CENDULA, A. SANCHETI, P. SIMON, G. CIBIRA, E. SERVICE, T. MOEHL, University of Zilina, Zilina, Slovakia

FJ-2:IL07 **Molybdenum Doped CuWO4-based Photoanodes for Solar Energy Conversion**
M.V. DOZZI, A. POLO, C. NOMELLINI, I. GRIGIONI, E. SELLI, Dipartimento di Chimica, Università degli Studi di Milano, Milano, Italy

FJ-2:IL08 **Light-driven Processes in Materials based on Colloidal Semiconductor Nanocrystals**
M. WÄCHTLER, Leibniz Institut of Photonic Technology, Jena, Germany

FJ-2:IL09 **Multiredox Catalysis on Metal Oxides for Solar Water Splitting**
C.A. MESA, Institute of Advanced Materials (INAM), Universitat Jaume I, Castellón, Spain

FJ-2:IL10 **Tailoring the Electron and Energy Transfer Mechanisms in Heterogeneous Photocatalysis by TiO2 Silanization: A Promising Opportunity for Emerging Technological Applications**
M. D'ARIENZO[1], F. PARRINO[2], R. SCOTTI[1], L. PALMISANO[3], S. DIRÈ[2], M. BELLARDITA[3], R. CECCATO[2], S. MOSTONI[1], B. DI CREDICO[1], [1]Department of Materials Science (INSTM), University of Milano-Bicocca, Milano, Italy; [2]Department of Industrial Engineering (DII), University of Trento, Trento, Italy; [3]Department of Engineering, University of Palermo, Palermo, Italy

FJ-2:IL11 **Post-excitation Transient IR Phenomena in α-Fe2O3 Films**
A. SULIGOJ, D. GRINBERG, **Y. PAZ**, Department of Chemical Engineering, Technion, Haifa, Israel

FJ-2:IL12 **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:IL13 **Surface Plasmon-driven Inactivation of Microorganisms and Decomposition of Organic Compounds**
M. ENDO-KIMURA[1], B. OHTANI[1], A. MARKOWSKA-SZCZUPAK[2], **E. KOWALSKA**[1], [1]ICAT, Hokkaido University, Sapporo, Japan; [2]West Pomeranian University of Technology, Szczecin, Poland

Session FJ-3

Design approaches for advanced applications

FJ-3:IL01 **Theoretical Design of Perovskite Based Photovoltaic Materials**
ZHENYU LI, Hefei National Laboratory for Physical Sciences at Microscale, University of Science and Technology of China, Hefei, China

FJ-3:L02 **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:IL03 **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:L04 **Comparison of the Properties and Photocatalytic Activity of Two Different C,N-TiO2 Semiconductors Obtained using Renewable Raw Materials as Doping Source**
M.C. ARIZA-TARAZONA, E.I. CEDILLO-GONZÁLEZ, C. SILIGARDI, Dipartimento di Ingegneria "Enzo Ferrari", Università degli studi di Modena e Reggio Emilia, Modena, Italy

FJ-3:L05 **Al & Ga doped ZnO Nanowires for Water Remediation by Photocatalysis**
A. BAILLARD[1], E. APPERT[1], T. DEDOVA[3], P. GAFFURI[1,2], M. DANILSON[4], M. WEBBER[1], O. CHAIX-PLUCHERY[1], I. OJA-ACIK[3], V. CONSONNI[1], [1]Université Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; [2]Université Grenoble Alpes, CNRS, Grenoble INP, Institut NEEL, Grenoble, France; [3]Laboratory of Thin Film Chemical Technologies, Department of Materials and Environmental Technology, Tallinn Univ. of Technology, Tallinn, Estonia; [4]Laboratory of Optoelectronic Materials Physics, Department of Materials and Environmental Technology, Tallinn Univ. of Technology, Tallinn, Estonia

FJ-3:L06 **Harnessing Broad Spectrum Solar Energy for Selective CO2 Photoreduction with Water**
L. HAMMOUD, C. STREBLER, J. QUINET, S. BARDEY, V. KELLER, **V. CAPS**, Institut de Chimie et des Procédés pour l'Energie, l'Environnement et la Santé (ICPEES), Université de Strasbourg, UMR CNRS 7515, Strasbourg, France

FJ-3:L07 **Unbiased Photoelectrochemical Water Splitting Cell Exceeding >10% Solar-to-hydrogen Conversion Efficiency with Surface Band-modified Cu(In,Ga)(S,Se)2 Photocathode and Halide Perovskite Solar Cell**
BYUNGHA SHIN, Dept. of Materials Science and Engineering, Korea Advanced Institute of Science and Technology, Daejeon, South Korea

SYMPOSIUM FK

THERMOELECTRICS: MATERIALS RESEARCH AND APPLICATION TECHNOLOGIES

Session FK-1

Thermoelectric materials research & characterization

FK-1:IL01 **Synergy between Theory, Calculations, and Experiments: How to Improve it**
M. FORNARI, Department of Physics and Science of Advanced Materials Program, Central Michigan University, Mt. Pleasant, MI, USA

FK-1:IL02 **Assessing the Effect of Synthetic Conditions on PEDOT Thermoelectric Properties: A Combination of First Principles and Classical Molecular Dynamics Simulations**
A. CAPPAI, **C. MELIS**, Department of Physics, University of Cagliari, Cittadella Universitaria, Monserrato (CA), Italy; D. NARDUCCI, Department of Materials Science, University of Milano-Bicocca, Milano, Italy

FK-1:IL03 **Ab Initio Calculations of Thermal Transport Properties in Semiconductors and Metals**
L. CHAPUT, Institut Universitaire de France, Paris Cedex, Université de Lorraine, LEMTA, UMR 7563, Vandœuvre-lès-Nancy, France

FK-1:IL04 **Correlated Disorder in Thermoelectric Materials**
B. BRUMMERSTEDT IVERSEN, Center for Integrated Materials Research, Department of Chemistry, Aarhus University, Denmark

FK-1:IL05 **Recent Advances in Understanding of Resonant States in Thermoelectric Materials**
B. WIENDLOCHA, Faculty of Physics and Applied Computer Science, AGH University of Science and Technology, Krakow, Poland

FK-1:IL06 **Band Structure and Scattering Phase Diagram of Half-Heusler Thermoelectric Materials**
CHENGUANG FU, TIEJUN ZHU, Zhejiang University, Hangzhou, China

FK-1:IL08 **From Designing Thermoelectric Highly Efficient Hf-free n- & p-type Heusler Compounds via Phase Separation and Nano-composites to the Automated Fabrication of HH-modules**
B. BALKE, Fraunhofer Research Institution for Materials Recycling and Resource Strategies IWKS, Hanau, Germany; D. ZUCKERMANN, Isabellenhütte Heusler GmbH & Co. KG, Dillenburg, Germany

FK-1:L09 **Innovative Oxidation Protective Glass Coating for Magnesium Silicide-based Thermoelectrics**
F. D'ISANTO[1], F. SMEACETTO[1], K. CHEN[2], M.J. REECE[2], M. SALVO[1]. [1]Department of Applied Science and Technology (DISAT), Politecnico di Torino, Torino, Italy; [2]Nanoforce Technology Limited and School of Engineering & Materials Science, Queen Mary University of London, London, UK

FK-1:IL10 **Layered Chalcogenides as Thermoelectric Materials**
P. VAQUEIRO, Department of Chemistry, University of Reading, Reading, UK

FK-1:IL11 **Unexpected Interstitials in Half-Heusler Compounds**
WENJIE XIE[1], R. YAN[1], A. WEIDENKAFF[1,2], [1]Department of Materials and Earth Sciences, Technical University of Darmstadt, Darmstadt, Germany; [2]Fraunhofer Research Institution for Materials Recycling and Resource Strategies IWKSK, Germany

FK-1:IL12 **Crystal Structure and Thermoelectric Application of Zintl Mg3Sb2-based Materials**
TSUTOMU KANNO, Panasonic Corporation, Seika, Kyoto, Japan

FK-1:IL13 **Thermomagnetic Transport in Layered Topological Semimetals**
M. ZEBARJADI, Md.S. AKHANDA, E. REZAEI, K. ESFARJANI, University of Virginia, Charlottesville, VA, USA; S. KRYLYUKE, A.V. DAVYDOV, N, Material Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD, USA

FK-1:IL14 **High-performance Thermoelectric Oxides**
A.V. KOVALEVSKY, G. CONSTANTINESCU, D. LOPES, K.V. ZAKHARCHUK, S. RASEKH, A.A. YAREMCHENKO, CICECO - Aveiro Institute of Materials, Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal; N.M. FERREIRA, i3N, Physics Department, University of Aveiro, Aveiro, Portugal; W. XIE, A. WEIDENKAFF, Materials and Resources, Techn. Universität Darmstadt, Darmstadt, Germany; A. GALATANU, National Institute of Materials Physics, Magurele, Romania; M.H. AGUIRRE, Condensed Matter Physics Department, University of Zaragoza, Institute of Material Science of Aragón, ICMA-CSIC, Zaragoza, Spain; Advanced Microscopy Laboratory I+D Building-Campus Río Ebro, Zaragoza, Spain

FK-1:IL15 **Ductile Inorganic Semiconductors and their Applications in Thermoelectrics**
LIDONG CHEN, XUN SHI, Shanghai Institute of Ceramics, CAS, Changning, Shanghai, China

FK-1:IL16 **Low-temperature Thermoelectric Material Ta4SiTe4 and Nb4SiTe4**
YOSHIHIKO OKAMOTO, Nagoya University, Nagoya, Japan

FK-1:IL17 **Ultrahigh Thermoelectric Figure of Merit in Hole-doped Polycrystalline SnSe**
IN CHUNG, School of Chemical and Biological Engineering, Seoul National University, Seoul, South Korea

FK-1:L18 **A New Oxidation Resistant Glass-ceramic Coating for Titanium Suboxide (TiOx)**
F. SMEACETTO[1], F. D'ISANTO[1], H-P. MARTIN[2], R. SEDLÁK[3], M. LISNICHUK[3,4], A. CHRYSANTHOU[5], M. SALVO[1], [1]Department of Applied Science and Technology (DISAT), Politecnico di Torino, Torino, Italy.; [2]Fraunhofer Institute of Ceramic Technologies and Systems, Dresden, Germany; [3]Institute of Materials Research, Slovak Academy of Sciences, Kosice, Slovakia; [4]Institute of Physics, Faculty of Science, P.J. Safárik University, Kosice, Slovakia; [5]School of Physics, Engineering and Computer Science, University of Hertfordshire, Hatfield, Herts, UK

FK-1:L19 **Boosting the Anisotropic Thermoelectric Performance of PEDOT:PSS by Brush Printing**
BOKAI ZHANG, F. MOLINA-LOPEZ, KU Leuven, Leuven, Belgium

FK-1:IL20 **Complex Sulfide Thermoelectric Materials**
C. BOURGES, WPI International Center for Materials Nanoarchitechtonics (WPI-MANA), National Institute for Materials Science (NIMS), Tsukuba, Japan

FK-1:IL21 **Optimization of Thermoelectric Properties in Some Transition Metal Sulfides: the Role of Magnetism**
S. HEBERT, Laboratoire CRISMAT Normandie Université, UMR6508 CNRS, ENSICAEN, UNICAEN, Caen, France

FK-1:IL22 **Perovskites with Low Thermal Conductivity**
A. GRAFF, A. BARANOVSKIY, A. AZULAY, **Y. AMOUYAL**, Department of Materials Science & Engineering, Technion - Israel Institute of Technology, Haifa, Israel

FK-1:IL23 **Soft Thermoelectrics and Additive Manufacturing for New Thermoelectric Applications**
J.J. URBAN, LBNL, Berkeley, CA, USA

FK-1:IL24 **Current Progress and Challenges in Organic Thermoelectrics**
M. CAMPOY-QUILES, Institute of Materials Science of Barcelona (ICMAB-CSIC), Bellaterra, Spain

FK-1:IL25 **Molybdenum-based Cluster Compounds as Candidates for High-temperature Thermoelectric Applications**
C. CANDOLFI[1], P. GOUGEON[2], P. GALL[2], R. GAUTIER[2], A. DAUSCHER[1], B. LENOIR[1], [1]Institut Jean Lamour, UMR 7198 CNRS - Université de Lorraine, Nancy Cedex, France; [2]Univ Rennes, CNRS, ISCR UMR 6226, INSA Rennes, ENSC Rennes, Rennes, France

FK-1:IL26 **Si-based Nanowires for Integrated Micro Thermo-electric Generators**
A. MORATA[1], J.M. SOJO GORDILLO[1], C. DUQUE SIERRA[1], A. TARANCÓN[1,2], [1]Catalonia Institute for Energy Research (IREC), Sant Adrià de Besòs, Barcelona, Spain; [2]Institució Catalana de Recerca I Estudis Avançats (ICREA), Barcelona, Spain

FK-1:IL27 **Recent Developments in Thermoelectric Pnictides**
K. KOVNIR, Department of Chemistry, Iowa State University, Ames Laboratory, U.S. Department of Energy, AMES, IA, USA

FK-1:IL28 **Liquid Thermocells with High Thermopowers for Low-grade Heat Harvesting**
DONGYAN XU, Department of Mechanical and Automation Engineering, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong Special Administrative Region, China

Session FK-2
Solid-state device research and modeling

FK-2:IL01 **Thermoelectric Material with Electrolyte Gate**
HIROMICHI OHTA, Research Institute for Electronic Science, Hokkaido University, Sapporo, Japan

FK-2:IL02 **Thermoelectric Silicide Devices: Mechanical Reliability Large-scale Synthesis, and Module Integration**
YU-CHIH TSENG, Canmet Materials, Natural Resources Canada, Hamilton, Canada

FK-2:IL03 **Modelling of TEG System Integrated to Heat Sources and Thermal Impedance Management of TE Device Structures**
TSUTOMU IIDA, H. KUNIOKA, K. YOKOTA, T. MOTEGI, H. TSUCHIDA, Y. IZUMI, K. YOSHIMURA, R. INOUE, Y. ARAI, Y. KOGO, J. KUSAKA, Y. DAISHO, Tokyo University of Science, Tokyo, Japan; Waseda University, Tokyo, Japan; NISSAN Motor Co.,Ltd., Yokohama, Japan; Honda R&D Co.,Ltd., SUZUKI Co.,Ltd. Yokohama, Japan

FK-2:IL04 **Innovative Design of Thermoelectric Micro-generators based on Bismuth-telluride**
S. EL OUALID[1], F. KOSIOR[1], A. DAUSCHER[1], C. CANDOLFI[1], G. SPAN[2], E. MEHMEDOVIC[2], J. PARIS[2], **B. LENOIR**[1], [1]Institut Jean Lamour, UMR 7198 CNRS, Université de Lorraine, Nancy Cedex, France; [2]Mahle Thermoelektronik GmbH, Duisburg, Germany

FK-2:IL05 **The Black Metal for Enhanced Thermoelectric Power Generation**
CHUNLEI GUO, University of Rochester, Rochester, NY, USA

FK-2:IL06 **Phonon Engineering in Thermoelectric Materials and Flexible Thermoelectric Devices for Body Heat Harvesting and Personal Thermoregulation**
WOOCHUL KIM, School of Mechanical Engineering, Yonsei University, Seoul, South Korea

Session FK-3
Converter technologies and applications

FK-3:IL01 **Additive Manufacturing Approaches for Thermoelectrics**
S. LEBLANC, R. WELCH, B. SISIK, Department of Mechanical and Aerospace Engineering, The George Washington University, Washington, DC, USA

FK-3:L02 **Additive and Minimalistic Process of Flexible Inorganic Thermoelectric Devices Enabled by Laser-printing on Plastic Foil**
YUAN TIAN, F. MOLINA-LOPEZ, KU Leuven, Leuven, Belgium

FK-3:L03 **Two-in-one Management and Recovering of Thermal Energy from LTCC Flip-chip Packages**
N. JAZIRI, M.-K. IQBAL, A. SCHULZ, H. BARTSCH, J. MÜLLER, Electronics Technology Group, Institute of Micro and Nanotechnologies MacroNano, Technische Universität Ilmenau, Ilmenau, Germany; F. TOUNSI, Systems Integration & Emerging Energies (SI2E), École Nationale d'Ingénieurs de Sfax (ENIS), Université de Sfax, Sfax, Tunisia

FK-3:IL04 **An Update on the Development of Skutterudite-based Thermoelectric Technology for Integration into an MMRTG**
T. CAILLAT[1], S. PINKOWSKI[1], I. CHI[1], C.-K. HUANG[1], K. SMITH[1], K. YU[1], J. PAIK[1], P. GOGNA[1], B. PHAN[1], E. HEIAN[1], T. HOLGATE[2], Y. SONG[2], J. VANDERVEER[2], R. BENNETT[2], S. KEYSER[2], P. FRYE[3], K. WEFERS[3], [1]Jet Propulsion Laboratory/California Institute of Technology MS 277-207, Pasadena CA, USA; [2]Teledyne Energy Systems, Inc., Hunt Valley, MD, USA; [3]Aerojet Rocketdyne, Canoga Park, CA, USA

FK-3:IL05 **Hybrid Thermionic-thermoelectric Generators for Concentrated Solar Radiation: Technological Advances and Future Challenges**
A. BELLUCCI, Istituto di Struttura della Materia-CNR (ISM-CNR), DiaTHEMA Lab, Monterotondo (RM), Italy

FK-3:IL06 **Oxide Thermoelectric from Materials Synthesis to Modules**
N. PRYDS, Technical University of Denmark, Department of Energy Conversion and Storage, Kgs. Lyngby, Denmark

SYMPOSIUM FL

STIMULI RESPONSIVE AND MULTIFUNCTIONAL POLYMERS: PROGRESS IN MATERIALS AND APPLICATIONS

Session FL-1

Shape-memory polymers and actuators

FL-1:IL01 **Self-healing Copolymers via van der Waals Interactions**
M.W. URBAN, Clemson University, Department of Materials Science and Engineering, Clemson, SC, USA

FL-1:IL02 **Multifunctional Interpenetrated Polymer Networks**
K. ROHTLAID[1], F. BRAZ RIBEIRO[1], T.M.G. NGUYEN[1], C. SOYER[2], J.D.W. MADDEN[3], E. CATTAN[2], F. VIDAL[1], **C. PLESSE**[1], [1]CY Cergy Paris Université, LPPI, Cergy, France; [2]Univ. Polytechnique des Hauts de France, CNRS, Univ. Lille, Yncrea, Centrale Lille, UMR 8520 - IEMN, DOAE, Valenciennes, France; [3]Department of Electrical & Computer Engineering, Advanced Materials & Process Engineering Laboratory, University of British Columbia, Vancouver, Canada

FL-1:IL03 **Shape-memory Polymer Actuators for Robotics**
A. LENDLEIN, Institute of Biomaterial Science, Helmholtz-Zentrum Geesthacht, Teltow, Germany, & University of Potsdam, Potsdam, Germany

FL-1:L04 **Stress-free two-way Shape Memory Effect of Poly(caprolactone)-based Semicrystalline Networks**
S. PANDINI, N. INVERARDI, Department of Mechanical and Industrial Engineering, University of Brescia, Brescia, Italy; M. TOSELLI, Department of Industrial Chemistry "Toso Montanari", University of Bologna, Bologna, Italy; M. MESSORI, Department of Applied Science and Technology, Politecnico di Torino, Torino, Italy; G. SCALET, F. AURICCHIO, Department of Civil Engineering and Architecture, University of Pavia, Pavia, Italy

FL-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 FL-2

Degradable, stimuli-sensitive polymers

FL-2:IL01 **Stimuli-responsive Polymer-based Sensors, Muscles, and Drug Delivery Platforms**
M.J. SERPE, Department of Chemistry, University of Alberta, Edmonton, Canada

FL-2:IL02 **pH-sensitive Polymers and Polymer Nanocomposites for Drug Delivery**
BIQIONG CHEN, Queen's University Belfast, Belfast, UK

Session FL-3

Stimuli-sensitive gels

FL-3:IL01 **How Can "Smart" Organometallic Hydrogels Learn and Forget**
M.A. HEMPENIUS, K. ZHANG, X. FENG, S. SUI, **G.J. VANCSO**, University of Twente, Enschede, The Netherlands

FL-3:L02 **Characterisation and Development of Polycationic Electro-Active Hydrogels**
M. KAIKOV, **A. SORT-MONTENEGRO**, E. DEASY, L. DOWLING, C. DELANEY, L. FLOREA, School of Chemistry & AMBER, the SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, Dublin, Ireland

FL-3:L03 **Stimuli Responsive Hydrogel Actuators for Microscale Cargo Transport**
T. SPRATTE, C. ARNDT, C. SELHUBER-UNKEL, Institute for Molecular Systems Engineering, Heidelberg University, Germany; R. COLACO, A. STAUBITZ, Institute for Organic and Analytical Chemistry, Bremen University, Germany; N. GEID, J. RÜHE, IMTEK-Department of Microsystems Engineering, Freiburg University, Germany

FL-3:IL04 **Dually Cross-linked Stimuli-sensitive Gels**
D. KUCKLING[1], M. RODIN[1], J. LI[1,2], J. PARADIES[1], M. YIN[2], [1]Department of Chemistry, Paderborn University, Paderborn, Germany; [2]State Key Laboratory of Chemical Resource Engineering, Beijing Laboratory of Biomedical Materials, Beijing University of Chemical Technology, Beijing, China

FL-3:IL05 **Stimuli-sensitive Underwater Adhesive Gels inspired by Sandcastle Worms**
M. KAMPERMAN, Zernike Institute for Advanced Materials, University of Groningen, Groningen, The Netherlands

Session FL-4

Multifunctional (nano)composites and surfaces; multi-material systems

FL-4:IL01 **Light-driven Shape Change, Assembly, and Non-equilibrium Motion of Responsive Polymer Composites**
R.C. HAYWARD, University of Colorado Boulder, Boulder, CO, USA

FL-4:IL02 **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

FL-4:IL03 **Flexible Sensors Driven by Piezoionic Effect**
HIDENORI OKUZAKI, University of Yamanashi, Kofu, Japan

FL-4:IL04 **Molecular and Bulk Mechanics of Multifunctional Catecholamine Polymer Coatings**
P. DELPARASTAN[1], K. MALOLLARI[2], K. LEE[3], M. PARK[2], C. GRIGOROPOULOS[2], **P.B. MESSERSMITH**[1,3,4], [1]Materials Science and Engineering Department, [2]Mechanical Engineering Department, [3]Bioengineering Department, University of California, Berkeley, CA, USA; [4]Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA, USA

FL-4:IL05 **Carbon Nanotubes vs Graphene as Fillers for Functional Polymers**
P. POULIN, Centre de Recherche Paul Pascal CNRS, University of Bordeaux, Pessac, France

FL-4:L06 **Optical Sensor Based on Redox-active Tetrazolium / Pluronic Nanoparticles Embedded in PDMS Films**
E. ARAYA-HERMOSILLA, F. VISENTIN, V. MATTOLI, Center for Materials Interfaces, Istituto Italiano di Tecnologia, Pontedera, Italy; R. ARAYA-HERMOSILLA, Programa Institucional de Fomento a la Investigación, Desarrollo e Innovación, Universidad Tecnológica Metropolitana, Santiago, Chile; F. PICCHIONI, Department of Chemical Engineering - Product Technology, University of Groningen, Groningen, The Netherlands; A. PUCCI, Department of Chemistry, University of Pisa, Pisa, Italy

Session FL-5

Pharmaceutical and medical applications of smart polymers

FL-5:IL01 **Biomaterials for Regenerative Engineering: Enabling Regenerative Medicine**
G. AMEER, Northwestern University, Evanston, IL, USA

FL-5:IL02 **Oxidation-sensitive Polymers as Anti-inflammatory Agents**
N. TIRELLI, Laboratory of Polymers and Biomaterials, Fondazione Istituto Italiano di Tecnologia (IIT), Genova, Italy

FL-5:IL03 **Shape Memory Polymer Hydrogel Foams for Crohn's Fistula Healing**
M.B.B. MONROE[1], H.T. BEAMAN[1], B. HOWES[2], P. GANESH[1], [1]Biomedical and Chemical Engineering, BioInspired Syracuse, Syracuse University, Syracuse, NY, USA; [2]Chemistry, Lemoyne University, USA

FL-5:IL04 **A New Class of Submolecular Switches based on the DBCOD Conformational Change**
W. FU[1], T. ALAM[2], R. ADAMS[3], J.C. LI[4], W. YANG[4], **JENNIFER LU**[1], [1]Materials Science and Engineering, University of California at Merced, Merced, CA, USA; [2]Sandia National Laboratory, USA; [3]Chemistry Department, University of Manchester, UK; [4]Chemistry Department, Duke University, USA

FL-5:IL05 **Biodegradable Injectable Polymer Systems Exhibiting Temperature-responsive Irreversible Gelation**
YUICHI OHYA, Faculty of Chemistry, Materials and Bioengineering, Kansai University, Suita, Japan

Session FL-6

Additive manufacturing for multifunctional materials

FL-6:IL01 **Shaping Matter by using Light: 3D Laser-assisted Additive Manufacturing for Fundamental Neuromechanobiology and In-vitro Disease Models**
A. ACCARDO, Department of Precision and Microsystems Engineering, Delft University of Technology, Delft, The Netherlands

FL-6:IL02 **Building Multifunctional, Morphing 3D Structures**
T.H. WARE, Department of Biomedical Engineering, Department of Materials Science and Engineering, Texas A&M University, College Station, TX, USA

FL-6:IL03 **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. ARSLAN[1], P. GRUBER[4,5], M. MARKOVIC[4,5], A. OVSIANIKOV[4,5], H. DECLERCQ[6], P. DUBRUEL[1], **S. VAN VLIERBERGHE**[1,2], [1]Polymer Chemistry & Biomaterials Group, Centre of Macromolecular Chemistry, Ghent University, Ghent, Belgium; [2]Brussels Photonics, Department of Applied Physics and Photonics, Vrije Universiteit Brussel, Brussels, Belgium; [3]Plastic and Reconstructive Surgery, Department of Surgery, University Hospital Ghent, Ghent, Belgium; [4]Institute of Materials Science and Technology, Vienna University of Technology (TU Wien), Austria; [5]Austrian Cluster for Tissue Regeneration (www.tissue-regeneration.at); [6]Tissue engineering and Biomaterials Group, Department of Basic Medical Sciences, University Hospital Ghent, Ghent, Belgium

FL-6:IL04 **Advancing 4D Fabrication and Computational Analysis of Shape-Memory Polymers**
J.H. HENDERSON, BioInspired Syracuse: Institute for Material and Living Systems, Syracuse Biomaterials Innovation Facility, Syracuse University, Syracuse, NY, USA

Session FL-7

Multifunctional materials for soft robotics

FL-7:IL01 **Bioinspired Smart Materials: Sensing, Solar Harvesting, and Soft Robotics**
XIMIN HE, University of California at Los Angeles, Los Angeles, CA, USA

FL-7:L02 **Triplet Enhanced Photomechanics of Stilbene Photopolymers for Soft Robotic Actuator Applications**
D. BEERY, G. MCLEOD, K. HANSON, Florida State University, Department of Chemical Engineering; E. STANISAUSKIS, Florida State University, Materials Science and Engineering; D. RAMESH, **W. OATES**, Florida A&M-Florida State Universities, Department of Mechanical Engineering, Tallahassee, FL, USA

FL-7:L03 **Direct Laser Writing of Responsive Polymer Microstructures - Towards Soft Robotics at the Micro-scale**
L. FLOREA, T. FARAONE, S. KOLAGATLA, A. ENNIS, L. LAVELLE, Colm Delaney School of Chemistry & AMBER, the SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, Ireland

FL-7:IL04 **HASEL Artificial Muscles**
C. KEPLINGER, Max Planck Institute for Intelligent Systems, Stuttgart, Germany

FL-7:IL05 **Multi-functional Flexible Sensors for Soft Fobotics**
KUNIHARU TAKEI, Osaka Prefecture University, Sakai, Osaka, Japan

FL-7:IL06 **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. MAZZOLAI[4], [1]Botany: Functional Morphology & Biomimetics, Botanic Garden of the University of Freiburg, Freiburg, Germany; [2]Freiburg Materials Research Centre (FMF) and Freiburg Institute for Interactive Materials & Bioinspired Technologies (FIT), Germany; [3]Cluster of Excellence Living, Adaptive and Energy-autonomous Materials Systems (livMatS @ FIT); [4]Italian Institute of Technology (IIT), Italy

SYMPOSIUM FM

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

Session FM-1

Materials and materials design, basic phenomena and theory, functional properties

FM-1:IL01 **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

FM-1:IL02 **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

FM-1:IL03 **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

FM-1:L04 **Effect of Doping on Magnetocrystaline Anisotropy of Ni-Mn-Ga Magnetic Shape Memory Alloy: An Ab Initio Study**
M. ZELENY, 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

FM-1:IL05 **Elasticity and Microstructures in Shape Memory Alloys: from Highly Mobile Interfaces to Kwinks**
H. SEINER, Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic

FM-1:L06 **Age Hardening Behavior of (Ni+Cu)-rich Ti-Ni-Cu Alloys**
TAE-HYUN NAM, JI-HYUN KIM, Gyeongsang National University, Jinju, South Korea

FM-1:IL07 **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

FM-1:IL08 **Transition Metals Doping of Ni-Mn-Ga and Comparison of Single Crystals Grown by Different Methods**
O. HECZKO, V. KOPECKÝ, D. MUSIIENKO, 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

FM-1:IL09 **Optimizing Novel Manufacturing Processes for Ni-Mn-Ga Magnetic Shape Memory Materials**
E. PAGOUNIS, ETO MAGNETIC GmbH, Stockach, Germany

FM-1:IL10 **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 AMADÈ, M. SOLZI, Department of Mathematical, Physical and Computer Sciences, University of Parma, Parma, Italy

FM-1:IL11 **Reentrant Martensitic Transformation in Co-based Heusler Alloys**
XIAO XU[1], T. KANOMATA[2], R. KAINUMA[1], [1]Department of Materials Science, Graduate School of Engineering, Tohoku University, Sendai, Japan; [2]Research Institute for Engineering and Technology, Tohoku Gakuin University, Tagajo, Japan

FM-1:IL12 **Coupled Transformation and Plasticity in NiTi Shape Memory Alloy**
P. SEDLÁK, B. BENEŠOVÁ, M. FROST, H. SEINER, Institute of Thermo-mechanics, Czech Academy of Sciences, Prague, Czech Republic; L. HELLER, P. ŠITTNER, Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic

FM-1:L13 **Relationship of the Lattice Parameter with the Degree of Ordering in Fe-Ga Alloys: Experimental and Ab Initio Studies**
V.D. BUCHELNIKOV, M.V. MATYUNINA, M.A. ZAGREBIN, V.V. SOKOLOVSKIY, Chelyabinsk State University, Chelyabinsk, Russia; A.M. BALAGUROV, Joint Institute for Nuclear Research, Dubna, Russia; I.S. GOLOVIN, National University of Science and Technology "MISIS", Moscow, Russia

FM-1:IL14 **Symmetry Analysis of Martensitic Transition in Magneto-caloric Heusler Alloys**
F. ORLANDI[1], A. CAKIR[2], R. WAITE[1, 3], P. MANUEL[1], D,D. KHALYAVIN[1], M, ACET[4], L. RIGHI[5, 6], [1]ISIS Facility, Rutherford Appleton Laboratory - STFC, Chilton, Didcot, UK; [2]Mugla Stiki Kocman University, Department of Metallurgical and Materials Engineering, Mugla, Turkey; [3]H.H. Wills Physics Laboratory, University of Bristol, Bristol, UK; [4]Faculty of Physics and Center for Nanointegration (CENIDE), Universitat Duisburg-Essen, Duisburg, Germany; [5]Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Parma, Italy; [6]IMEM-CNR, Parma, Italy

FM-1:IL15 **TEM Studies on Magnetic and Crystallographic Micro-structures Associated with Martensitic Phase Transformations**
YASUKAZU MURAKAMI, Department of Applied Quantum Physics and Nuclear Engineering, Kyushu University, Fukuoka, Japan

FM-1:L16 **Ultrasonic-based Evaluation of NiTi Elasticity during Stress-induced Martensitic Transformation**
T. GRABEC, K. ZOUBKOVA, P. STOKLASOVA, P. SEDLAK, H. SEINER, Institute of Thermomechanics of the CAS, Prague, Czech Republic

FM-1:L17 **Theory and Application of NiTi Thin Film Coatings for Non-destructive Defect Analysis**
PING WU, BOON TEOH TAN, Singapore University of Technology and Design, Singapore

FM-1:L18 **Shape Recovery Behaviour of NiTi-PMMA Composite**
S. SAMAL, O. KOSJAKOVA, D. VOKOUN, P. ŠITTNER, FZU-Institute of Physics of Czech Academy of Science, Prague, Czech Republic

FM-1:L19 **The Way for the Controlling the Martensite Stabilization Effect in NiTi-based Alloys**
N. RESNINA, I. PONIKAROVA, P. EGOROV, A. GABRIELIAN, S. BELYAEV, Saint-Petersburg State University, Saint-Petersburg, Russia

FM-1:L20 **Evolution of Structure and Properties of Nickel-enriched Ti-Ni Shape Memory Alloy Subjected to Bi-axial Deformation**
V. KOMAROV, R. KARELIN, V. YUSUPOV, Baikov Institute of Metallurgy and Materials Science, Moscow, Russia; G. KORPALA, R. KAWALLA, U. PRAHL, TU Bergakademie Freiberg, Germany; I. KHMELEVSKAYA, S. PROKOSHKIN, National University of Science and Technology MISIS, Moscow, Russia

FM-1:IL21 **Multicaloric effects in Shape Memory Alloys**
L. MANOSA, Universitat de Barcelona, Barcelona, Catalonia, Spain

FM-1:IL22 **The Use of Magnetic Shape Memory Alloys in Multicaloric Refrigeration Cycles**
T. GOTTSCHALL, E. BYKOV, Y. SKOURSKI, J. WOSNITZA, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany; A. GRÀCIA-CONDAL, LL. MAÑOSA, A. PLANES, Universitat de Barcelona, Barcelona, Catalonia, Spain; B. BECKMANN, A. TAUBEL, L. PFEUFFER, O. GUTFLEISCH, Technical University of Darmstadt, Darmstadt, Germany

FM-1:L23 **Magnetocaloric and Elastocaloric Properties of Polycrystalline Samples of NiMnGaCu Ferromagnetic Shape Memory Alloy: Effect of Improvement of Thermoelastic Martensitic Transformation**
E. VILLA[1], C. TOMASI[2], F. VILLA[1], A. NESPOLI[1], F. PASSARETTI[1], E. BESTETTI[1], R. FRIGERIO[1], F. ALBERTINI[3], G. LAMURA[4], F. CANEPA[5], [1]Consiglio Nazionale delle Ricerche – Istituto della Materia Condensata e di Tecnologie per l'Energia (CNR-ICMATE Sede di Lecco), Lecco, Italy; [2]Consiglio Nazionale delle Ricerche – Istituto della Materia Condensata e di Tecnologie per l'Energia (CNR-ICMATE Sede di Genova), Genova, Italy; [3]Consiglio Nazionale delle Ricerche – Istituto dei Materiali per l'Elettronica e il Magnetismo, Parma, Italy; [4]CNR-SPIN, Genova, Italy; [5]Dipartimento di Chimica e Chimica Industriale, Università di Genova, Genova, Italy

FM-1:IL24 **Segregation Tendencies in Heusler Alloys from First Principles**
V.V. SOKOLOVSKIY[1], M.E. GRUNER[2], P. ENTEL[2], M. ACET[2], V.D. BUCHELNIKOV[1], [1]Faculty of Physics, Chelyabinsk State University, Chelyabinsk, Russia; [2]Faculty of Physics and Center for Nanointegration, CENIDE, University of Duisburg-Essen, Duisburg, Germany

FM-1:L25 **Research of the Aging Process of TiNi Alloy in Coarse-grained and Ultrafine-grained States**
A.A. CHURAKOVA, E.M. KAYUMOVA, Institute of Molecule and Crystal Physics - Subdivision of the Ufa Federal Research Center of the Russian Academy of Sciences, Ufa State Aviation Technical University, Ufa State Petroleum Technological University, Ufa, Russia

Session FM-2
Thin films and micro nano-systems

FM-2:IL01 **Shell Ferromagnetism**
M. ACET[1], A. CAKIR[2], M. FARLE[1], [1]Physics Faculty, Duisburg-Essen University, Duisburg, Germany; [2]Department of Metallurgical and Materials Engineering, Muğla Sıtkı Koçman University, Muğla, Turkey

FM-2:IL02 **Microstructure Engineering of Magnetic Shape Memory Thin Films and Nanostructures**
F. CASOLI, M. TAKHSHA GHAHFAROKHI, 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

FM-2:IL03 **Epitaxial NiTi Thin Films: Growth, Microstructure and Martensitic Phase Transition**
K. LÜNSER[1, 2, 3], S. SCHWABE[1], K. NIELSCH[1, 2], S. FÄHLER[3], [1]Leibniz IFW Dresden, Institute for Metallic Materials, Dresden, Germany; [2]Institute of Materials Science, TU Dresden, Dresden, Germany; [3]Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Dresden, Germany

FM-2:L04 **Shape-memory Heusler Films Towards Nanoscale by Lithography Patterning**
M. TAKHSHA, G. TREVISI, L. NASI, F. CASOLI, F. ALBERTINI, IMEM-CNR, Parma, Emilia-Romagna, Italy; J.A. ARREGI, M. HORKÝ, V. UHLÍR, CEITEC BUT, Brno University of Technology, Brno, South Moravian, Czech Republic

FM-2:IL05 **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

FM-2:L06 **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 C.J. GARCÍA-CERVERA, University of California Santa Barbara & Basque Center for Applied Mathematics

Session FM-3
SMAS engineering and applications

FM-3:IL01 **3D Reconstitution and Numerical Analysis of Thermo-mechanical Behavior of Porous and Cellular Shape Memory Alloys**
T. BEN ZINEB[1], R. XU[1, 2], S. ZHU[3], C. CISSÉ[4], R. NISHANT[3], C. BOUBY[1], A. CHEROUAT[3], H. ZAHROUNI[1], H. HU[2], W. ZAKI[4], [1]Université de Lorraine, CNRS, Arts et Métiers Paris Tech, LEM3, Nancy, France; [2]School of Civil Engineering, Wuhan University, Wuchang, Wuhan, China; [3]University of Technology of Troyes, ICD/GAMMA3, Troyes, France; [4]Khalifa University of Science and Technology, Abu Dhabi, UAE

FM-3:IL02 **NiTi Surfaces for Minimally Invasive Medical Devices**
A. UNDISZ, Friedrich-Schiller-Universität, Jena, Germany

FM-3:L03 **Finite Element Analysis of Mechanical Behavior of Porous Parts 3D Printed from NiMnGa Magnetic Shape Memory Alloy Powders**
C.V. SOLOMON[1], E. MYERS[1], R. VANNUTELLI[1], S. ISACCO[1], M.P. CAPUTO[2], [1]Rayen School of Engineering, Youngstown State University, Youngstown, USA; [2]Department of Science, Penn State Shenango, Sharon, PA, USA

FM-3:L04 **Thermomagnetic Thin Film Energy Harvester**
J. JOSEPH, M. KOHL, Karlsruhe Institute of Technology (KIT), Institute of Microstructure Technology (IMT), Karlsruhe, Germany; M. OHTSUKA, Institute of Multidisciplinary Research for Advanced Matls, Tohoku University, Sendai, Japan; H. MIKI, Institute of Fluid Science, Tohoku University, Sendai, Japan

FM-3:L05 **Investigation of the Damping Properties of Innovative NiTi Elements: Development of Proof of Concept and Demonstrators**
F. VILLA[1], E. BASSANI[1], G. DE CEGLIA[2], T. CLAUDE PARKEL[3], F. PASSARETTI[1], S. VISCUSO[4], E. VILLA[1], [1]National Research Council - Institute of Condensed Matter Chemistry and Technologies for Energy (CNR ICMATE), Lecco, Italy; [2]Technosprings Italia Srl, Besnate (VA), Italy; [3]CSEM - Centre Suisse d'Electronique et de Microtechnique, Landquart (GR), Switzerland; [4]TSS InnovationProjekte GmbH, Roveredo (GR), Switzerland

FM-3:L06 **Shape Memory Alloy Torsion Drive Operation Temperatures Optimization**
A.V. SIBIREV, S.P. BELYAEV, N.N. RESNINA, Saint-Petersburg State University, Saint-Petersburg, Russia

FM-3:IL07 **Smart Structures with Embedded NiTi Actuators for Aerospace Applications**
P. BETTINI, D. RIGAMONTI, Department of Aerospace Science and Technology, Politecnico di Milano, Milan, Italy

FM-3:IL08 **Thermomagnetic Materials for Harvesting Low Temperature Waste Heat**
D. DZEKAN[1], A. WASKE[2], K. NIELSCH[1], S. FÄHLER[3], [1]Leibniz IFW Dresden, Institute for Metallic Materials, TU Dresden, Institute for Material Science, Dresden, Germany; [2]BAM, Berlin, Germany; [3]Leibniz IFW Dresden, Institute for Metallic Materials, Dresden, Germany

FM-3:IL09 **Development of Tube-based Structures to be Applied in Durable and Efficient Elastocaloric Cooling Device**
S. DALL'OLIO, A. ŽEROVNIK, L. PORENTA, Ž. AHČIN, J. CERAR, P. KABIRIFAR, **J. TUŠEK**, Faculty of Mechanical Engineering, University of Ljubljana, Ljubljana, Slovenia

SYMPOSIUM FN

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

Session FN-1
Adaptive/Active Textiles

FN-1:IL01 **Textile Actuation - Its Mechanisms, Potentials and Challenges**
N.-K. PERSSON[1, 2], C. BACKE[1], M. ASADI MIANKAFSHE[1], T. BASHIR[1, 3], E. JAGER[4], L. GUO[1], [1]The Swedish School of Textiles, Polymeric E-textiles, University of Borås, Borås, Sweden; [2]Smart Textiles Technlogy Lab, Smart Textiles, University of Borås, Borås, Sweden; [3]Swedish Centre for Resource Recovery, University of Borås, Borås, Sweden; [4]Linköping University, Department of Physics, Chemistry and Biology (IFM), Sensor and Actuator Systems, Linköping, Sweden

FN-1:IL02 **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

FN-1:IL03 **Nanogenerator - Energy Harvesting and Delivery for Self-powered Human Interface Devices**
SANG-WOO KIM, Sungkyunkwan University (SKKU), Suwan, South Korea

FN-1:L04 **In Air Rotational Twisted Yarn Actuator for Haptics**
S. MEHRAEEN[1], E.W.H. JAGER[1], D. MELLING[2], C. PLESSE[3], N.K. PERSSON[4], [1]Bionics and Transduction Science, Department of Physics, Chemistry and Biology (IFM), Linköping University, Linköping, Sweden; [2]School of Engineering and Materials, Queen Mary University, Mile End Road, London, UK; [3]Laboratoire de Physico-chimie des Polymères et des Interfaces (LPPI), EA2528, CY Cergy Paris Université, Cergy, France; [4]Swedish School of Textiles, Smart Textiles, Polymeric E-textiles, University of Borås, Borås, Sweden

Session FN-2
e-Textiles

FN-2:KL **Intelligent Wearable Systems Integrated with Smart Textiles and Artificial Intelligence**
XIAOMING TAO, Research Institute for Intelligent Wearable Systems, Hong Kong Polytechnic University, Kowloon, Hong Kong, China

FN-2:IL01 **Energy Harvesting and Storage with Electronic Textiles**
A. SATHARASINGHE, **T. HUGHES-RILEY**, T. DIAS, Advanced Textiles Research Group, School of Art & Design, Nottingham Trent University, Nottingham, UK

FN-2:IL02 **Nanostructured Coatings for the Functionalization of Textiles**
M. AVELLA[1], R. AVOLIO[1], R. CASTALDO[1], M. COCCA[1], F. DE FALCO[1], M.E. ERRICO[1], M. LAVORGNA[2], **G. GENTILE**[1], [1]Institute for Polymers Composites and Biomaterials - National Research Council of Italy, Pozzuoli (NA), Italy; [2]Institute for Polymers Composites and Biomaterials - National Research Council of Italy, Portici (NA), Italy

FN-2:IL03 **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

FN-2:IL04 **A Hybrid Textile Electrode for Simultaneous Wireless ECG and Body Motion Measurement**
G.K. STYLIOS, XIANG AN, Heriot Watt University, Research Institute for Flexible Materials, Galashiels, Selkirkshire, UK

FN-2:IL05 **Bioelectronic Textiles: Materials and Systems**
E. ISMAILOVA, Department of Bioelectronics, Ecole Nationale Supérieure des Mines de Saint Etienne, CMP-EMSE, MOC, Gardanne, France

FN-2:IL06 **Ultra-safe Weavable 1D Batteries for Wearable Electronics**
NIAN LIU, School of Chemical and Biomolecular Engineering, Georgia Institute of Technology, Atlanta, GA, USA

FN-2:IL07 **Wearable Sensors Based on Nano-carbon Composites and Networks**
A. DALTON, University of Sussex, Brighton, UK

FN-2:IL08 **Smart Textiles with Powering and Sensing Abilities based on Fiber and Fabric Triboelectric Nanogenerators**
KAI DONG, Beijing Institute of Nanoenergy and Nanosystems, CAS, Beijing, China

FN-2:IL09 **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

FN-2:IL10 **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

FN-2:IL11 **Thin-film Electronics on Large-area Plastic Substrates for e-textiles**
N. MÜNZENRIEDER, Faculty of Science and Technology, Free University of Bozen-Bolzano, Bozen, Italy

Session FN-3
Functionality, Manufacturing, Application

FN-3:IL01 **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

FN-3:IL02 **Advances in Wearable Photovoltaic Fabrics**
YONG K. KIM, University of Massachusetts Dartmouth, North Dartmouth, MA, USA

FN-3:L03 **Nanocomposite Motion Tape Sensors for Functional Movement Assessment**
Y.-A. LIN, X. ZHAO, S.-C. HUANG, **K.J. LOH**, Department of Structural Engineering, University of California San Diego, La Jolla, CA, USA

FN-3:L04 **Dual, One-step, Integration of Sensing and Actuation in 2D Flexible Structures by Weaving Assembly**
C. BACKE[1], J.G. MARTINEZ[2], L. GUO[1], E. JAGER[2], N-K. PERSSON[1, 3], [1]The Swedish School of Textiles, Polymeric E-textiles, University of Borås, Borås, Sweden; [2]Linköping University, Department of Physics, Chemistry and Biology (IFM), Sensor and Actuator Systems, Linköping, Sweden; [3]Smart Textiles Technology Lab, Smart Textiles, University of Borås, Borås, Sweden

FN-3:IL05 **Electrospun Nanofibers as designed 3D-structures for Nanomedicine**
I. BONADIES, Institute for Polymers, Composites and Biomaterials (IPCB)-CNR, Pozzuoli (NA), Italy

FN-3:IL06 **Digital Printing for Functional and Smart Textiles**
V. NIERSTRASZ, J. YU, S. SEIPEL, R. HASHEMI SANATGAR, V. MALM, Textile Materials Technology, Department of Textile Technology, The Swedish School of Textiles Faculty of Textiles, Engineering and Business, University of Borås, Borås, Sweden

FN-3:IL07 **Integrating Printed Electronics into Fashion, Sport and Leisure Garments**
A. CLAYPOLE, J. CLAYPOLE, **T. CLAYPOLE**, Welsh Centre for Printing and Coating, College of Engineering, Swansea University Bay Campus, Crymlyn Burrows, Swansea, UK

FN-3:IL08 **E-Textiles Technologies and Application - Uniting Electronics and Textiles**
M. VON KRSHIWOBLOZKI, C. KALLMAYER, C. DILS, Fraunhofer IZM, Berlin, Germany; M. SCHNEIDER-RAMELOW, TU Berlin, Berlin, Germany

SYMPOSIUM FO
EMBODYING INTELLIGENCE IN STRUCTURES AND INTEGRATED SYSTEMS

Session FO-1
Smart Materials/Sensors/Actuators/MEMs/NEMs

FO-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

FO-1:IL02 **Modelling and Simulation of Electro-active Materials**
A. HUMER, A. PECHSTEIN, **M. KROMMER**, Institute of Technical Mechanics, JKU Linz, Linz, Austria

FO-1:L03 **Large Deformation and Hysteresis in Non-linear Electro-mechanics**
A. HUMER, A. PECHSTEIN, M. KROMMER, Institute of Technical Mechanics, Johannes Kepler University, Linz, Austria

FO-1:L04 **Indoor Organic Cells (IOC) Modeling and Identification for Light-Fidelity (LiFi) Communications**
M. PARENT, M. PASQUINELLI, L. ESCOUBAS, J-J. SIMON, Aix Marseille Université, Université de Toulon, CNRS, IM2NP, Marseille, France; G. CHABRIEL, J. BARRERE, Université de Toulon, Aix Marseille Université, CNRS, IM2NP, Marseille, France; S. BEN DKHIL, B. CRUCHON, H. ALKHATIB, F. ARCHET, Dracula Technologies, Valence, France

FO-1:IL05 **Experimental Characterization of a Smart Material via DIC**
S. CASCIATI, D. BORTOLUZZI, SIART srl, Pavia, Italy

FO-1:IL06 **Optimization of Stiffness Profile for Bio-inspired Propulsion**
M.R. HAJJ, Civil, Environmental and Ocean Engineering, Stevens Institute of Technology, NJ, USA; V. MEESALA, Engineering Mechanics Program, Virginia Tech, VA, USA

FO-1:IL07 **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

Session FO-2
Integration technologies

FO-2:IL01 **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

FO-2:IL02 **The Smart Potential of Vision-based Technology**
L. FARAVELLI, Zhejiang University, Hangzhou, China; D. BORTOLUZZI, SIART srl, Pavia, Italy

FO-2:IL03 **Control of Random Rocking Dynamics of Multidimensional Structures**
A.S. KOVALEVA, Space Research Institute, RAS, Moscow, Russia

FO-2:IL04 **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

FO-2:IL05 **Simulation of Bending of a Plate Consisting of Shape Memory and Elastic-plastic Layers under Thermocycling after Preliminary Bending or Stretching**
A.E. VOLKOV, N.A. VOLKOVA, E.A. VUKOLOV, Saint-Petersburg State University, Saint-Petersburg, Russia

Session FO-3
Smart structures and integrated systems

FO-3:L01 **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

FO-3:L02 **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

FO-3:L03 **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

FO-3:IL04 **Adaptive Stiffness Structural Systems: State of the Art and Practice**
S. NAGARAJAIAH, Rice University, Houston, TX, USA

FO-3:IL05 **Advances in Wind Engineering for Resilient Communities**
A. KAREEM, NatHaz Modeling Laboratory, University of Notre Dame, Notre Dame, IN, USA

FO-3:IL06 **Intelligent Systems in Infrastructure Engineering**
M.P. SINGH, Department of Biomedical Engineering and Mechanics, Virginia Tech, Blacksburg, VA, USA

FO-3:L07 **State-of-the-Art Wayside Monitoring Techniques for Highspeed Railway Systems**
L. ZHOU, Y.Q. NI, Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Kowloon, Hong Kong, China

Session FO-4
Ongoing and perspective applications

FO-4:IL01 **Provisions for Passive Control Devices in the New Eurocode 8**
C.Z. CHRYSOSTOMOU, Cyprus University of Technology, Limassol, Cyprus

FO-4:IL02 **Some Aspects in Managing Smart Cities**
R. DE LOTTO, University of Pavia, Department of Civil Engineering and Architecture, Pavia, Italy

FO-4:L03 **Monitoring the Building Response during Borehole Excavation**
D. BORTOLUZZI, M. FRANCOLIN, SIART srl, Pavia, Italy

FO-4:IL04 **Challenges toward the Enhancement of Seismic Resilience for Tokyo Metropolitan Area**
AKIRA NISHITANI[1], K. KAJIWARA[2], T. NAGAE[3], T. INOUE[2], K. KUSUNOKI[4], I. NAKAMURA[2], K. HAYASHI[5], M. KURATA[6], Y. KAWAMATA[2], E. SATO[2], [1]Waseda University, Tokyo, Japan; [2]NIED, Japan; [3]Nagoya University, Japan; [4]University of Tokyo, Japan; [5]Toyohashi University of Technology, Japan; [6]Kyoto University, Japan

FO-4:IL05 **Rail Bolt Joint Looseness Monitoring Using PZT Sensing Network**
LU ZHOU[1,2], **YI-QING NI**[1,2], [1]Hong Kong Branch of National Transit Electrification and Automation Engineering Technology Research Center, The Hong Kong Polytechnic University, Hong Kong, China; [2]Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Hong Kong, China

FO-4:IL06 **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

FO-4:IL07 **Integration of Identification and Vibration Control of Time-Varying Structures under Unknown Seismic Excitations**
YING LEI, JUBIN LU, JINSHAN HUANG, School of Architecture and Civil Engineering, Xiamen University, Xiamen, China

Special Session FO-5

Workshop on "Autonomic, Adaptive and Self-Sustaining Systems: Future Perspectives"

FO-5 **Multifunctional Design of Autonomic, Adaptive and Self-sustaining Systems: An Overview**
B.-L. ("LES") LEE, Air Force Office of Scientific Research, Arlington, VA, USA

FO-5 **Biological Blueprints Towards Next Generation Multiscale Composites**
A. POHL[1], T. WANG[1], W. HUANG[1], P. ZAVATTIERI[2], **D. KISAILUS**[1], [1]University of California, Riverside, CA, USA; [2]Purdue University, USA

FO-5 **Powerful, Large Stroke Electrochemical Carbon Nanotube Yarn Artificial Muscles and their Use for Energy Harvesting**
R.H. BAUGHMAN, University of Texas at Dallas, Dallas, TX, USA

FO-5 **An Active Mechanical Willis Metamaterial with Asymmetric Polarizabilities**
G. HUANG, University of Missouri, Columbia, MO, USA

FO-5 **Towards Morphogenic Manufacturing: Reaction-diffusion Driven Structure in Thermoset Polymeric Materials**
N. SOTTOS, University of Illinois Urbana Champaign, Urbana, IL, USA

FO-5 **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

FO-5 **Smart Skin for Robots**
C. LIU[1], X. CHEN[1], T. TOPAC[2], **F.K. CHANG**[2], [1]Department of Mechanical Engineering, Stanford University, Stanford, CA, USA; [2]Department of Aeronautics and Astronautics, Stanford University, Stanford, CA, USA

FO-5 **Biohybrid Systems for Morphing**
D. LENTINK, University of Groningen, Groningen, The Netherlands

FO-5 **Towards a Fly-by-Feel Morphing Wing using Reinforcement Learning**
K.P.T. HAUGHN, **D.J. INMAN**, University of Michigan, Ann Arbor, MI, USA

FO-5 **Multistable Morphing Skins Enabled by Additive Manufacturing**
J. BAUR, University of Illinois Urbana-Champaign, Urbana, IL, USA

FO-5 **Multi-functional Structures Technologies for Aerospace Applications - Status and Future**
J. KUDVA, NextGen Aeronautics, Torrance, CA, USA

SYMPOSIUM FP

BIOLOGICAL, BIOHYBRID AND BIOINSPIRED MATERIALS: FROM ELECTRONICS AND PHOTONICS TO MEDICINE

Session FP-1

Classes of materials and their (bio)synthesis, structure and chemical modification

FP-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

FP-1:IL02 **Remote Activation of Intracellular Pathways using Magnetic Nanoparticles and Cadherins**
P. GOMOLLÓN-ZUECO[1], C. CASTRO[1], J.M. DE LA FUENTE[1, 2], R.M. FRATILA[1,2], P. MARTÍNEZ-VICENTE[1], **M. MOROS**[1,2], [1]Instituto de Nanociencia y Materiales de Aragón (INMA), CSIC-Universidad de Zaragoza, Zaragoza, Spain; [2]Centro de Investigación Biomédica en Red de Bioingeniería, Biomateriales y Nanomedicina (CIBER), Spain

FP-1:IL03 **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

FP-1:IL04 **Organic Bioelectronics from a Molecular Design Perspective**
C. NIELSEN, Queen Mary University of London, London, UK

FP-1:L05 **Surface-specific Polymerization and Deposition of Dopamine: a Novel Mussel-inspired Coating Technology**
M.L. ALFIERI, M. D'ISCHIA, Dept. of Chemical Sciences, University of Naples Federico II, Naples, Italy; M. MASSARO, S. RIELA, Department of Biological, Chemical and Pharmaceutical Sciences and Technologies (STEBICEF), University of Palermo, Palermo, Italy

FP-1:IL06 **Biomimetic Surfaces as Facilitator for a Clean Environment**
H. HÖLSCHER, Karlsruhe Institute of Technology (KIT), Eggenestein-Leopoldshafen, Germany

FP-1:L07 **Recyclable MOF-based Biocatalysts**
R. RICCO, Asian Institute of Technology, Pathum Thani, Thailand

Session FP-2

Electronic devices with biological and bio-inspired materials

FP-2:IL01 **Designing Biomimetic Electronic Interfaces**
F. SANTORO, Tissue Electronics, Istituto Italiano di Tecnologia, Naples, Italy

FP-2:IL02 **Plant Based Biohybrid Systems**
E. STAVRINIDOU, Laboratory of Organic Electronics, Department of Science and Technology, Linköping University, Norrköping, Sweden

FP-2:IL03 **Bacterial Photosynthetic Reaction Centers in Optoelectronic Devices**
F. MILANO, CNR-ISPA Institute of Sciences of Food Production, Lecce, Italy; M. TROTTA, CNR IPCF Institute for Physical and Chemical Processes, Bari, Italy; R. RAGNI, D. VONA, G. BUSCEMI, G.M. FARINOLA, Chemistry Department, University of Bari Aldo Moro, Bari, Italy

FP-2:IL04 **Silk Protein for Opto-electronic Skin Devices**
SUNGHWAN KIM, Department of Physics & Department of Energy Systems Research, Ajou University, Suwon, South Korea

FP-2:IL05 **Interfacing Photosynthetic Enzymes with Newly Designed Transparent Electrode Materials**
J. KARGUL, Solar Fuels Laboratory, Centre of New Technologies, University of Warsaw, Warsaw, Poland

FP-2:IL06 **Biological-organic Biohybrid Systems Interfaced with Electrodes**
D. VONA[1], G. BUSCEMI[1, 2], R. LABARILE[1, 2], R. RAGNI[1], F. MILANO[2], **M. TROTTA**[2], [1]Dipartimento di Chimica, Università di Bari, Bari, Italy; [2]Istituto per i Processi Chimico Fisici, Consiglio Nazionale delle Ricerche, Bari, Italy

FP-2:IL07 **Nanomaterial Engineering and Bioengineering of Living Photovoltaics for Enhanced Performance**
A. BOGHOSSIAN, EPFL, Lausanne, Switzerland

FP-2:IL08 **Stretchable and Healable Bioelectronic Materials**
F. CICOIRA, Polytechnique Montreal, Montreal, Canada

FP-2:IL09 **The Electrochemical Domain of Bacterial Photosynthesis**
G. BUSCEMI[1, 2], D. VONA[1], P. STUFANO[3], R. LABARILE[1, 2], **M. GRATTIERI**[1, 2], [1]Università degli Studi di Bari "Aldo Moro", Bari, Italy; [2]Consiglio Nazionale delle Ricerche IPCF-CNR, Bari, Italy; [3]Consiglio Nazionale delle Ricerche CNR-NANOTEC, Bari, Italy

FP-2:IL10 **A New in Vivo Model for Bioelectronics**
C. TORTIGLIONE, Istituto di Scienze Applicate e Sistemi Intelligenti, Consiglio Nazionale delle Ricerche, Pozzuoli, Italy

FP-2:IL11 **The Mammalian Eumelanin Pigment as Novel (Bio)Material for Applications in Energy Conversion**
A. PEZZELLA, Department of Physics "Ettore Pancini", University of Naples "Federico II," Naples, Italy; Institute for Polymers, Composites and Biomaterials (IPCB), CNR, Pozzuoli, Italy; National Interuniversity Consortium of Materials Science and Technology (INSTM), Florence, Italy

Session FP-3

Photonic devices with biological and bio-inspired materials

FP-3:IL01 **Measuring Cellular Dynamics with Microlaser-based Sensors**
M. SCHUBERT[1], L. WOOLFSON[1], I.R.M. BARNARD[1], A.M. DORWARD[2], B. CASEMENT[1], A. MORTON[1], G.B. ROBERTSON[2], G.B. MILES[3], C.S. TUCKER[4], S.J. PITT[2], **M.C. GATHER**[1, 5], [1]SUPA, School of Physics and Astronomy, University of St Andrews, UK; [2]School of Medicine, University of St Andrews, UK; [3]School of Psychology & Neuroscience, University of St Andrews, UK; [4]The Queen's Medical Research Institute, University of Edinburgh, UK; [5]Centre for NanoBioPhotonics, Dept. für Chemie, University of Cologne, Köln, Germany

FP-3:IL02 **Photosynthesis Enhancement in Diatom Microalgae by Photoactive Molecules**
C. D'ANDREA[1, 2], G. LEONE[3], G. DE LA CRUZ VALBUENA[1, 2], S.R. CICCO[3], D. VONA[3], E. ALTAMURA[3], R. RAGNI[3], E. MOLOTOKAITE[2], M. CECCHIN[4], S. CAZZANIGA[4], M. BALLOTTARI[4], G. LANZANI[1, 2], G.M. FARINOLA[3], [1]Department of Physics, Politecnico di Milano, Milano, Italy; [2]Center for NanoScience and Technology @PoliMi, Istituto Italiano di Tecnologia, Italy; [3]Department of Chemistry University of Bary, Italy; [4]Department of biotechnology, University of Verona, Italy

FP-3:IL03 **Engineering of Nanostructed Materials through Cellulose Mineralization**
I. POSTNOVA, **Y. SHCHIPUNOV**, Institute of Chemistry, Russian Academy of Sciences, Vladivostok, Russia

FP-3:L04 **Bioinspired Hydrogel Structures for Responsive Photonics**
C. DELANEY[1], J. QIAN[2], L. BRADLEY[2], L. FLOREA[1], [1]School of Chemistry & AMBER, the SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, Ireland; [2]School of Physics and AMBER, Trinity College Dublin, College Green, Dublin, Ireland

FP-3:IL05 **Engineering Hierarchical Architectures for Bio-inspired Photonics**
N. STINGELIN, Georgia Institute of Technology, Atlanta, GA, USA

FP-3:IL06 **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

FP-3:IL07 **Biomimetic Colour Engineering Form Nature to Applications**
S. VIGNOLINI, Department of Chemistry, University of Cambridge, Cambridge, UK

FP-3:IL08 **Hybrid Plasmonic/Photonic Crystals for Optical Detection of Bacterial Contaminants**
G.M. PATERNÒ[1], L. MOSCARDI[1, 2], S. DONINI[1], D. ARIODANTI[3], I. KRIEGEL[4], E. PARISINI[1], G. LANZANI[1, 2], F. SCOTOGNELLA[1, 2], [1]Center for Nano Science and Technology@PoliMi, Istituto Italiano di Tecnologia, Milano, Italy; [2]Dipartimento di Fisica, Politecnico di Milano, Milano, Italy; [3]Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta", Milano, Italy; [4]Department of Nanochemistry, Istituto Italiano di Tecnologia (IIT), Genova, Italy

FP-3:IL09 **Multifunctional Optical Materials in Nature: Responsive Photonic Structures and the Role of Scale Geometry and Disorder**
B. WILTS, University of Salzburg, Salzburg, Austria

Session FP-4

Bio-medical devices with biological and bio-inspired materials

FP-4:IL01 **Novel Biomaterial and Quantum Dot Integrated Optoelectronic Neural Interfaces**
S. NIZAMOGLU, Department of Electrical and Electronics Engineering, Koç University, Istanbul, Turkey

FP-4:IL02 **Functional Nanomaterials and their Applications in the Therapy of Cancer and Infectious Diseases**
M. HÉMADI, France Laboratoire ITODYS, Université de Paris, CNRS-UMR 7086, Paris Cedex, France

FP-4:L03 **Antibacterial Structures Inspired by Cicada Wings**
A.M. BÜRGER, R.W. VAN NIEUWENHOVEN, L.L.E. MEARS, K. WHITMORE, **I.C. GEBESHUBER**, Vienna University of Technology, Vienna, Austria; C. SIMON, D.C. MARSHALL, University of Connecticut, USA; P. KIENZL. A. ELBE-BÜRGER, Medical University of Vienna, Austria

FP-4:IL04 **Mechano-responsive Color-changing Photonic Materials: Scalable Manufacture for Wearables and Medical Textiles**
M. KOLLE, Massachusetts Institute of Technology, Cambridge, MA, USA

FP-4:IL05 **Nature Inspired Design of Bioactive Antimicrobial Materials**
G. LUCIANI, University of Naples Federico II, Dept. DICMaPI - Dept. Chemical, Materials and Industrial Production Engineering, Naples, Italy

FP-4:IL06 **Bioelectronics to Study and Regenerate Bone**
Y. FU, F. SANTORO, S. CARTMELL, D. WIDERA, R.M. OWENS, D. IANDOLO, Department of Chemical Engineering and Biotechnology, University of Cambridge, UK; F. SANTORO, IIT, Naples, Italy; S. CARTMELL, University of Manchester, UK; D. WIDERA, School of Pharmacy, University of Reading, UK; **D. IANDOLO**, INSERM, U1059 Sainbiose, Université Jean Monnet, Mines Saint-Étienne, Université de Lyon, Campus Santé Innovation, Saint-Étienne, France

FQ - 13th International Conference

ADVANCED BIOMATERIALS AND NANO-BIOTECHNOLOGY FOR MEDICINE

FQ:KL **Coming to Age with Nanomedicine: Progress and Disappointments Over the Past 30 Years**
T.J. WEBSTER, CSA, Interstellar Therapeutics, USA; Professor, Vellore Institute of Technology, India and Hebei University of Technology, China

Session FQ-1

Advances in Biomaterials

FQ-1:IL01 **In Vitro Assessment of Ion-doped Bioactive Glasses for Bone Tissue Engineering: Silicate vs Silicon Oxycarbide-based Systems**
A.R. BOCCACCINI[1], M. ARANGO-OSPINA[1], F. XIE[2], R. RIEDEL[2], I. GONZALO-JUAN[2], E. IONESCU[2], [1]Institute of Biomaterials, University of Erlangen-Nuremberg, Erlangen, Germany; [2]Institute for Materials Science, Technische Universität Darmstadt, Darmstadt, Germany

FQ-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

FQ-1:IL03 **The Processing and Application of Controlled Porous Bioceramic Materials Based on Calcium Phosphates Doped with Different Cations**
Dj. VELJOVIC, R. PETROVIC, Dj. JANACKOVIC, Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia; V. UGRINOVIC, T. MATIC, Innovation Center of the Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia

FQ-1:IL04 **3D Printing of Biocompatible Ceramic Nanocomposites via Genipin-Chitosan Crosslinking**
J. MAINARDI, K. REZWAN, **M. MAAS**, Advanced Ceramics, University of Bremen, Bremen, Germany

FQ-1:IL05 **Nanomaterials with Tunable Properties for Drug Delivery**
S. MAJD, University of Houston, Biomedical Engineering, Houston, TX, USA

FQ-1:L06 **Physicochemical Study of a Calcium Carbonate-chitosan Composite Cement as a Potential Bone Substitute Material**
E. TOUFIK[1, 2, 3], H. NOUKRATI[2], C. REY[4], H. BEN YOUCEF[1], A. BARROUG[2, 3], C. COMBES[4], [1]Mohammed VI Polytechnic University (UM6P), HTMR-Lab, Benguerir, Morocco; [2]Mohammed VI Polytechnic University (UM6P), High Institute of Biological and Paramedical Sciences, ISSB-P, Benguerir, Morocco; [3]Cadi Ayyad University, Faculty of Sciences Semlalia, Marrakech, Morocco; [4]CIRIMAT, Université de Toulouse, CNRS, Toulouse INP-ENSIACET, Toulouse, France

FQ-1:L07 **New Bioactive Glasses with Therapeutic Ions to Tailor Specific Functionalities**
D. BELLUCCI, **V. CANNILLO**, Dipartimento di Ingegneria "E. Ferrari" Università di Modena e Reggio Emilia, Modena, Italy

FQ-1:L08 **The 5th Power Law Heat Response of ZnMn Ferrite Nanoparticles to the Magnetic Field**
N.N. LIU, A.P. PYATAKOV, M.V. Lomonosov Moscow State University, Moscow, Russia; M.N. ZHARKOV, N.A. PYATAEV, National Research Ogarev Mordovia State University, Saransk, Russia; G.B. SUKHORUKOV, School of Engineering and Materials Science, Queen Mary University of London, London, UK/ Skolkovo Institute of Science and Technology, Moscow, Russia; A.M. TISHIN, M.V. Lomonosov Moscow State University, Moscow, Russia/ AMT&C Group, Troitsk, Russia

FQ-1:IL09 **Functionalisation of Surfaces in Porous Ceramic Structures and 3D Flow Visualization**
K. REZWAN, University of Bremen, Advanced Ceramics, Bremen, Germany

FQ-1:IL10 **Integration of Supermolecule-based Biointerfaces and Growth Factors to Manipulate Cell Functions**
YOSHINORI ARISAKA, N. YUI, Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University, Chiyoda, Tokyo, Japan

FQ-1:IL11 **Isothermal Shape Change by Enzymatic Trigger**
P.T. MATHER, Penn State University, University Park, PA, USA; J.H. HENDERSON, S.L. BUFFINGTON, Syracuse University, USA

FQ-1:IL12 **Growing Integration Layer [GIL] Strategy for Bio-active Ceramic Coating on Metallic Alloys**
MASAHIRO YOSHIMURA[1, 2], CHI-HUANG HUANG[1], [1]Hi-GEM & PCGMR, Materials Science and Engineering, National Cheng Kung University, Tainan, Taiwan; [2]Tokyo Institute of Technology, Tokyo, Japan

FQ-1:IL13 **Functionalization of Titanium Implants by Surface Modification**
MASANORI KIKUCHI, National Institute for Materials Science, Tsukuba, Ibaraki, Japan

FQ-1:L14 **Spark Plasma Sintering, Crystallization, Mechanical Properties and Biological Behavior of an Innovative SrO- and MgO-containing Bioactive Glass**
D. ANGIONI, R. ORRÙ, G. CAO, Dipartimento di Ingegneria Meccanica, Chimica e dei Materiali, Università degli Studi di Cagliari, Cagliari, Italy; S. GARRONI, A. IACOMINI, Dipartimento di Chimica e Farmacia, Università degli Studi di Sassari, Sassari, Italy; D. BELLUCCI, V. CANNILLO, Dipartimento di Ingegneria "Enzo Ferrari", Università di Modena e Reggio Emilia, Modena, Italy

FQ-1:L15 **Surface Modification and Antibacterial Properties of Novel Superelastic Ti-Zr-Nb Alloys**
A.S. KONOPATSKY, T.O. TEPLYAKOVA, K.Yu. VLASOVA, National University of Science and Technology "MISIS", Moscow, Russia; M.V. Lomonosov Moscow State University, School of Chemistry, Moscow, Russia

FQ-1:L16 **Diatomite-based Nanocarriers for the Sustained Release of Galunisertib in Colorectal Cancer Cells**
C. TRAMONTANO[1, 2], G. CHIANESE[1], L. DE STEFANO[1], I. REA[1], E. LONARDO[3], D. DELLE CAVE[3], [1]Institute of Applied Science and Intelligent Systems (ISASI), National Research Council of Naples, Naples, Italy; [2]Department of Pharmacy, University of Naples Federico II, Naples, Italy; [3]Institute of Genetics and Biophysics (IGB), National Research Council of Naples, Naples, Italy

Session FQ-2
Tissue Engineering and Regenerative Medicine

FQ-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

FQ-2:IL02 **Bioceramics for Bone Regeneration and Beyond**
JIANG CHANG, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, China

FQ-2:IL03 **Smart Natural Hydrogels for Biomedical Applications**
S. FARÈ, Politecnico di Milano, Chemistry, Materials and Chemical Engineering Dept., Milan, Italy & INSTM, Florence, Italy

FQ-2:IL04 **PCL-based Matrices for Guided Tissue Regeneration**
JIN HO LEE, Department of Advanced Materials, Hannam University, Daejeon, South Korea

FQ-2:IL05 **Developing Multifunctional Scaffolds for Regenerating Complex Human Body Tissues**
MIN WANG, Department of Mechanical Engineering, The University of Hong Kong, Hong Kong, China

FQ-2:IL06 **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

FQ-2:IL07 **Inflammation Modulating Polymers for Tissue Tepair and Regeneration**
CHANGYOU GAO, Department of Polymer Science and Engineering, Zhejiang University, Hangzhou, China

Session FQ-3
New therapeutics and intelligent drug/biomolecule/ gene delivery systems

FQ-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

FQ-3:IL02 **Dendritic Nanoparticles as a Versatile Platform for Cancer Immunotherapy**
SEUNGPYO HONG, University of Wisconsin-Madison, Madison, WI, USA

FQ-3:IL03 **Novel Supramolecular Self-assembled Nano-carrier Systems for Drug and Gene Delivery**
JUN LI, Department of Biomedical Engineering, National University of Singapore, Singapore

FQ-3:IL04 **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

FQ-3:L05 **Biodegradable Particulate System for Efficient Non-invasive Transdermal Drug Delivery**
Y.I. SVENSKAYA, E.V. LENGERT, M.V. SAVELEVA, R.A. VERKHOVSKII, S.N. SHTYKOV, 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

FQ-3:L06 **Cell Membrane-covered Theragnostic Nanomaterials for Cancer Therapy**
V. MARANGONI, J. CANCINO, F. SANTOS, **V. ZUCOLOTTO**, Nanomedicine and Nanotoxicology Group, University of Sao Paulo, São Carlos, SP, Brazil

FQ-3:L07 **Agriculture Residue based Bioactive Glass for Targeted Drug Delivery and Bone Implantation**
D. KAUR, O.P. PANDEY, Functional Materials Lab, School of Physics and Materials Science; M.S. REDDY, Department of Biotechnology, Thapar Institute of Engineering & Technology, Patiala, India

Session FQ-4
Bio-imaging and theranostics

FQ-4:IL01 **Multifunctional Bioceramics and Glasses for Advanced Therapy and Theranostics**
F. BAINO, Institute of Materials Physics and Engineering, Applied Science and Technology Department, Politecnico di Torino, Torino, Italy

FQ-4:L02 **Theranostic Copper Oxide Nanoparticles Loaded Polymeric Nanocarriers as a Promising Drug Delivery System**
I.S. WEITZ, Department of Biotechnology Engineering, ORT Braude College, Karmiel, Israel

Session FQ-5
Clinical translations

FQ-5: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

FQ-4:IL02 **What Have we Learned from Bone? Bio-inspired Biomaterials and Approaches for Translational Musculoskeletal Tissue Engineering**
YUNZHI P. YANG, Departments of Orthopedic Surgery, (by courtesy) Materials Science and Engineering, and Bioengineering, Stanford University, Stanford, CA, USA

Focused Session FQ-6
Next Generation Implantable Neural Interfaces

FQ-6:IL01 **Electronic Materials and Devices for Neural Interfaces**
M.R. ABIDIAN, Biomedical Engineering, University of Houston, Houston, TX, USA

FQ-6:IL02 **Glial Interfaces: Materials, Devices and Approaches to Probe and Sense the "Other Brain".**
E. SARACINO[1], D. POLESE[2], D. SPENNATO[1], R. FABBRI[1], A.I. BORRACHERO-CONEJO[3,4], V. GUARINO[5], G.P. NICCHIA[6], M. MUCCINI[3], G. FORTUNATO[2], L. AMBROSIO[5], R. ZAMBONI[1], A. CONVERTINO[2], L. MAIOLO[2], **V. BENFENATI**[1], [1]CNR-ISOF, Istituto per la sintesi organica e la fotoreattività, Bologna, Italy; [2]CNR-IMM, Istituto per la Microelettronica e Microsistemi; [3]CNR-ISMN, Istituto per lo Studio dei Materiali Nanostrutturati, Bologna, Italy; [4]Vanderbilt University Dept. Biomedical Engineering, Nashville, TN, USA; [5]CNR-IPCB, Istituto per i Polimeri Compositi e Biomateriali, Napoli, Italy; [6]Università di Bari, Dept of Biotechnology Biosciences and Biopharmaceutics, Bari, Italy

FQ-6:IL03 **Interfacing Living Matter with Nanowires**
A. CONVERTINO, Istituto per la Microelettronica e i Microsistemi, CNR, Roma, Italy

FQ-6:IL04 **Magnetoelectric Nanomaterials for Wireless Neuronal Modulation**
K. KOZIELSKI, Technical University of Munich, Munich, Germany

FQ-6:IL05 **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

FQ-6:IL06 **Axon-like Neural Interface**
D.M. DURAND, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH, USA

FQ-6:IL07 **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 FQ-7
Wireless Body Sensor Networks for Healthcare Applications

FQ-7:IL01 **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, Duebendorf, Switzerland

FQ-7:IL02 **A Wearable Sensing Platform for the Unobtrusive Analysis of Sweat**
F. DI FRANCESCO[1], F.M. VIVALDI[1], A. DALLINGER[2], D. SANTALUCIA[1], A. BONINI[1], N. POMA[1], D. BIAGINI[1], F. GRECO[2, 3], [1]Department of Chemistry and Industrial Chemistry, University of Pisa, Pisa, Italy; [2]Institute of Solid State Physics, Graz University of Technology, Graz, Austria; [3]Institute of Biorobotics, Sant'Anna School of Advanced Studies, Pisa, Italy

FQ-7:IL03 **Transparent Flexible Graphene Materials Integration in Textiles for Wearable Sensors and Light-emitting Devices**
M. CRACIUN, Centre for Graphene Science, Nano Engineering Science and Technology Group, College of Engineering, Mathematics and Physical Sciences, University of Exeter, UK

FQ-7:IL04 **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

FQ-7:IL05 **Embedded Sensing by 3D Multi-material Printing**
G. KRIJNEN, A. DIJKSHOORN, M. SCHOUTEN, D. KOSMAS, G. WOLTERINK, Robotics and Mechatronics Dept., University of Twente, Enschede, The Netherlands

FQ-7:IL06 **Implantable Wireless Optofluidic Neural Devices and Scalable Wireless Technology for High-throughput Behavioral and Circuit Neuroscience**
JAE-WOONG JEONG, School of Electrical Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea

FQ-7:IL07 **Non-invasive Daily Diagnostics through Printed Sensor Technology**
M.P.M. JANK, Fraunhofer Institute for Integrated Systems and Device Technology, Thin-Film Systems Group, Erlangen, Germany

FQ-7:IL08 **InnoRetVision - A new Research Training Group on Innovative Retinal Interfaces for Optimized Artificial Vision funded by the German Research Foundation**
W. MOKWA[1], P. WALTER[2], S. INGEBRANDT[1], RWTH Aachen University [1]Institute of Materials in Electrical Engineering I, Aachen, Germany; [2]Department of Ophthalmology, University Hospital, Aachen, Germany

FQ-7:IL09 **Printed Wearable Metasurfaces for Wireless On-body Sensors**
S. GENOVESI, F. COSTA, A. TOGNETTI, Dipartimento di Ingegneria dell'Informazione, University of Pisa, Pisa, Italy

Focused Session FA-5 / FQ-8
3D Bioprinting of Soft Tissues and Organs
(Focused Joint Session with Conference FQ)

FA-5/FQ-8:IL01 **Two Photon Polymerization for Biofabrication**
R. NARAYAN, North Carolina State University, Raleigh, NC, USA

FA-5/FQ-8:IL02 **Biofabrication: From Additive Manufacturing to Bioprinting and Bioassembly for Regenerative Medicine Applications**
L. MORONI, Maastricht University, MERLN Institute for Technology-Inspired Regenerative Medicine, Complex Tissue Regeneration Department, Maastricht, The Netherlands

FA-5/FQ-8:IL03 **Putting 3D Bioprinting to the Use of Tissue Model Fabrication**
Y. SHRIKE ZHANG, Division of Engineering in Medicine, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Cambridge, MA, USA

FA-5/FQ-8:IL04 **Multimaterial and Multiscale Biofabrication Approach**
C. DE MARIA, Research Center E. Piaggio and Dept. of Information Engineering at University of Pisa, Pisa, Italy

FA-5/FQ-8:IL05 **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

FA-5/FQ-8:IL06 **Biofabricating Murine and Human Myo-substitutes for Rapid Volumetric Muscle Loss Restoration**
M. COSTANTINI, Institute of Physical Chemistry - PAS, Warsaw, Poland; C. GARGIOLI, Università degli studi di Roma - Tor Vergata, Rome, Italy

FA-5/FQ-8:L07 **Nano-encapsulation of Stem Cell-derived β-cell Aggregates using 3D Bioprinting System**
YEONGGWON JO, D.G. HWANG, M. KIM, S. CHO, J. JANG, Pohang University of Science and Technology (POSTECH), Pohang, Gyeongbuk, South Korea

FA-5/FQ-8:L08 **Modular Assembly of 3D Bioprinted Engineered Heart Tissue to Reconstruct Contractile Direction to Mimic Myocardial Fiber Orientation**
DONG GYU HWANG, U. YONG, H. CHOI, J. JANG, POSTECH, Pohang, Gyeongbuk, South Korea

FA-5/FQ-8:IL09 **Strategies for Bioprinting of Volumetric Tissue Constructs**
M. GELINSKY, Centre for Translational Bone, Joint and Soft Tissue Research, TU Dresden, Dresden, Germany

FA-5/FQ-8:IL10 **Organ-on-chip Technology for the Study of Neuro-degenerative Disorders**
A. POLINI, CNR Nanotec, Lecce, Italy

FA-5/FQ-8:IL11 **3D in Vitro Model of the Microbiota-gut-bone Axys**
G. VOZZI, F. BIAGINI, F. MONTEMURRO, C. DE MARIA, Research Center "E. Piaggio" and Department of Information Engineering, University of Pisa, Pisa, Italy; M. CALVIGIONI, E. GHELARDI, Research and New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy; G. CERQUENI, S. MARCHI, M. MATTIOLI-BELMONTE, DISCLIMO, Università Politecnica delle Marche, Ancona Italy.

FA-5/FQ-8:L12 **A Biohybrid 3D-printed Tissue-sensor Platform for Continuous Monitoring of Cardiac Muscle Contractions**
UIJUNG YONG[1], D. KIM[1], H. KIM[2], D. G. HWANG[1], S. CHO[1], H. NAM[1], S. KIM[1], T. Y. KIM[1], U. JEONG[1], K. KIM[1], W. K. CHUNG[1], W.H. YEO[2], J. JANG[1], [1]POSTECH, Pohang, Gyeongsangbuk-do, South Korea; [2]Georgia Institute of Technology, Atlanta, GA, USA

FA-5/FQ-8:L13 **3D Bioprinting of Human Islet-like Cellular Aggregates-Vascular Platform for Modeling Diabetes**
MYUNGJI KIM, S. CHO, D.G. HWANG, J. JANG, POSTECH, Pohang, Gyeongbuk, South Korea

FA-5/FQ-8:IL14 **Engineering the Cellular Niche Via CAD/CAM Laser Processing**
J. SAKSENA[1], S.C. SKLARE[1], B.T. VINSON[1], Y. HUANG[2], **D.B. CHRISEY**[1], [1]Tulane University, New Orleans, LA, USA; [2]University of Florida, Gainesville, FL, USA

FA-5/FQ-8:IL15 **Implantable Bioprinted Devices for Vascularisation Studies**
B. DERBY, Department of Materials, University of Manchester, Manchester, UK

FA-5/FQ-8:IL16 **3D Bioprinted Models in Human Organogenesis and Disease**
M. DOMINGOS, Department of Mechanical, Aerospace and Civil Engineering, School of Engineering, Faculty of Science and Engineering & The Henry Royce Institute,The University of Manchester, Manchester, UK

FA-5/FQ-8:IL17 **Toward in vitro Tissue Modeling using Bioprinting Technology**
JINAH JANG, POSTECH, Pohang, Gyeongbuk, South Korea

FR - 4th International Conference
MATERIALS CHALLENGES FOR SUSTAINABLE NUCLEAR FISSION AND FUSION TECHNOLOGIES

FR:KL **Decarbonization of the Energy Sector: Contribution of Nuclear Power Today and in Perspective**
S. MONTI, International Atomic Energy Agency, Vienna International Center, Vienna, Austria

Session FR-1
Structural components for nuclear fission and fusion applications

FR-1:IL01 **SiC-SiC CMC for Fusion Energy Technology**
YUTAI KATOH, T. KOYANAGI, B. PINT, Oak Ridge National Laboratory, Oak Ridge, TN, USA

FR-1:IL02 **Discrete and Continuum Models for Body Forces for Virtual Tokamak Reactor Simulations**
S.L. DUDAREV, M. BOLEININGER, M.R. GILBERT, P.-W. MA, D.R. MASON, L. REALI, UKAEA, Culham Science Centre, Oxfordshire, UK

FR-1:IL03 **Rapid, Combinatorial Down-selection of Materials for Fusion Power**
M. SHORT[1], B. DACUS[1], K. WOLLER[1], G. WALLACE[1], E. BOTICA ARTALEJO[1], K. HATTAR[2], C. DENNETT [3], W. ZHOU[1], A. PETERKIN[1], W. CAIRANG[1], Y. YANG[4], A. MINOR[5], G. ZHENG[1], [1]Massachusetts Institute of Technology, Cambridge, MA, USA; [2]Sandia National Lab., USA; [3] Idaho National Lab., USA; [4]Penn State University, USA; [5]University of California at Berkeley, USA

FR-1:L04 **Microstructural Characterization of Co-base ODS Alloy Prepared by Additive Manufacturing**
JINSUNG JANG[1], JUWON SUH[1,2], HEUNG NAM HAN[2], SUK HOON KANG[1], [1]Korea Atomic Energy Research Institute, Daejeon, South Korea; [2]Seoul National University, South Korea

FR-1:L05 **Oxidation of P91 Steel in Molten Lead**
M.E. ANGIOLINI, P. AGOSTINI, F. FABBRI, M. FALCONIERI, Department for Fusion and Technologies for Nuclear Safety and Security, ENEA, Rome, Italy; F. MURA, Centro di Ricerca per le Nanotecnologie Applicate all'Ingegneria, Università di Roma "La Sapienza", Rome, Italy

FR-1:L06 **Rapid Alloy Prototyping of Castable Steels with Dispersed Nano-precipitates for Nuclear Applications**
S. MEHRABAN, S. JONES, M. YAR, J. CULLEN, N. LAVERY, Swansea University Bay Campus, College of Engineering, Skewen, Swansea, UK; H. DAWSON, UKAEA Materials Division, United Kingdom Atomic Energy Authority, Culham Science Centre, Abingdon, UK

Session FR-2
Low activation structural materials for nuclear fusion systems

FR-2:IL01 **EUROFER97 as Structural Material for the ITER Test Blanket Module and the DEMO Starter Blanket**
G. AIELLO[1], E. GAGANIDZE[2], P. LAMAGNÈRE[3], G. PINTSUK[4], M. RIETH[2], D. TERENTYEV[5], M. ZMITKO[6], [1]EUROfusion - Programme Management Unit, Fusion Technology Department, Garching, Germany; [2]Karlsruhe Institute of Technology, Institute for Applied Materials, Eggenstein-Leopoldshafen, Germany; [3]CEA, DES, IRESNE, Nuclear Technology Department, Cadarache, Saint Paul-Lez-Durance, France; [4]Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung - Plasmaphysik, Jülich, Germany; [5]SCK CEN, Nuclear Materials Science Institute, Mol, Belgium; [6]Fusion for Energy (F4E), Barcelona, Spain

FR-2:IL02 **Radiological Response of Fusion Materials: Impact of Impurities Radwaste**
M.R. GILBERT, G.W. BAILEY, UKAEA, Culham Science Centre, Abingdon, UK

FR-2:IL03 **Development of Fabrication Technology for Low Activation Vanadium Alloys as Fusion Blanket Structural Materials**
TAKUYA NAGASAKA[1,2], T. TANAKA[1], J. SHEN[1,2], S. JIANG[3], K.-I. FUKUMOTO[4], T. TOYAMA[5], K. YABUUCHI[6], [1]National Institute for Fusion

Science, Toki, Japan; [2]SOKENDAI (The Graduate University for Advanced Studies), Toki, Japan; [3]Qilu University of Technology (Shandong Academy of Sciences), Jinan, China; [4]Research Institute of Nuclear Engineering, University of Fukui, Tsuruga, Japan; 5Institute for Materials Research, Tohoku University, Sendai, Japan; [6]Institute of Advanced Energy, Kyoto University, Uji, Japan

FR-2:L04 **Development of RAFM steels for DEMO Water Cooled blanket**
O. TASSA, L. BOZZETTO, E. ZANIN, RINA Consulting - CSM, Rome Italy; M. ANGIOLINI, L. PILLONI, C. CRISTALLI, L. BOZZETTO, E. ZANIN, N. BETTOCCHI, P. AGOSTINI, ENEA, Brasimone, Camugnano (BO), Italy

Session FR-3
Materials for first wall components of nuclear fusion systems

FR-3:IL01 **Development of Tungsten Fibre-reinforced Copper Alloy Composites for Application as Heat Sink Materials in DEMO High Heat Flux Components**
A. v. MÜLLER, B. BÖSWIRTH, H. GREUNER, K. HUNGER, P. JUNGHANNS, R. NEU, J. RIESCH, J.H. YOU, Max-Planck-Institut für Plasmaphysik, Garching, Germany; V. CERRI, A. MORIANI, S. ROCCELLA, E. VISCA, ENEA, Frascati RM, Italy; U. SIEFKEN, Louis Renner GmbH, Bergkirchen, Germany

FR-3:IL02 **Hydrogen Isotope Permeation in Fusion Reactor Materials**
K. HEINOLA, C. HILL, International Atomic Energy Agency, Vienna International Centre, Vienna, Austria

FR-3:IL03 **Development of ODS-Cu as Divertor Heat Sink Materials**
RYUTA KASADA, Institute for Materials Research, Tohoku University, Sendai, Japan

FR-3:IL04 **Controlling Interfaces for Enhanced Thermal and Radiation Stability in Tungsten PFMs**
J.R. TRELEWICZ, Stony Brook University, Stony Brook, NY, USA

FR-3:IL05 **Additive Manufacturing of Tailored Plasma-facing Fusion Wall Components**
D. DOROW-GERSPACH[1], A. KIRCHNER[2], M. GIPPERICH[3], TH. LOEWENHOFF[1], T. WEISSGÄRBER[2], M. WIRTZ[1], G. PINTSUK[1], CH. LINSMEIER[1], [1]Forschungszentrum Jülich, Institut für Energie- und Klimaforschung, Jülich, Germany; [2]Fraunhofer-Institut für Fertigungstechnik und Angewandte Materialforschung IFAM, Dresden, Germany; [3]Fraunhofer-Institut für Produktionstechnologie IPT, Aachen, Germany

FR-3:IL06 **Design and Challenges of Tritium Breeding Blanket Systems Tested in ITER**
H. TANIGAWA, W. GUAN, Y. MIYOSHI, T. KATAGIRI, T. HIROSE, Y. KAWAMURA, Rokkasho Fusion Institute, National Institutes for Quantum Science and Technology, Ibaraki, Japan

Session FR-4
Functional materials

FR-4:IL01 **Diagnostic First Mirrors: Plasma Impact on Diagnostic Materials and Components**
M. RUBEL[1], P. PETERSSON[1], SUNWOO MOON[1], J. GRZONKA[2], A. WIDDOWSON[3], and JET Contributors*, [1]KTH Royal Institute of Technology, Fusion Plasma Physics, Stockholm, Sweden; [2]Universidad de Cadiz, Cadiz, Spain; [3]Culham Science Centre, Abingdon, Oxfordshire, UK
*See list of authors: J. Mailloux, Nucl. Fusion 2021

FR-4:IL02 **Functional Materials - Polymer Type Materials for ITER Components**
V. BARABASH, G. KIM, M. LOUGHLIN, E. POLUNOVSKIY, ITER Organization, St. Paul Lez Durance Cedex, France

FR-4:IL03 **Characterization of Advanced Dielectric and Optical Materials for Application in DEMO**
R. VILA, D. CRUZ, E. LEÓN, Laboratorio Nacional de Fusión, CIEMAT, Madrid, Spain

FR-4:IL04 **Development of Next Generation Copper Alloys for High Heat Flux Application**
L.L. SNEAD[1], D.J. SPROUSTER[1], J.R. TRELEWICZ[1], S.J. ZINKLE[2], BIN CHENG[2], Y. YANG[3], [1]Stony Brook University, Stony Brook, NY, USA; [2]University of Tennessee, Knoxville. Knoxville TN, USA; [3]Oak Ridge National Laboratory, Oak Ridge, TN, USA

Session FR-5
Nuclear fuel materials

FR-5:IL01 **Characterization of Innovative Advance Reactor Metallic Fuel Concepts**
L. CAPRIOTTI[1], D.L. PORTER[1], J.H. HARP[2], D.M. WACHS[1], [1]Idaho National Laboratory, Idaho Falls, ID, USA; [2]Oak Ridge National Laboratory, Oak Ridge, TN, USA

FR-5:L02 **Mixed Actinides Oxides Synthesis by Solution Combustion Synthesis**
A. HAUTECOUVERTURE, C. REY, P. ESTEVENON, X. DESCHANELS, ICSM UMR 5257, CEA Marcoule, Bagnols sur Cèze, France

FR-5:L03 **Dislocation Nucleation in UO2 Spent Fuels evaluated by Synchrotron-based Laue Diffraction Method**
S. BHATTACHARYA, G. KURI, J. BERTSCH, Nuclear Energy and Safety Department, Paul Scherrer Institut, PSI-Villigen, Switzerland

FR-5:L04 **Microstructural Effect of p(O2) Variation in Mixed Oxides (MOX) Sintering**
G.C.C. MIRANDA, CEA/DES/ISEC/DMRC, Marcoule, France and Université Grenoble Alpes, Saint-Martin d'Hères, France; G. BERNARD-GRANGER, L. RAMOND, F. LEBRETON, CEA/DES/ISEC/DMRC, Université de Montpellier, Marcoule, France; A. NDIAYE, T. GERVAIS, Orano Melox, Chusclan, France

Session FR-6
Radiation effects

FR-6:IL01 **Frontiers of Transmutation Materials Science Characterization**
D.J. SPROUSTER, J.R. TRELEWICZ, T. KOYANAGI, Y. KATOH, L.L SNEAD, Stony Brook University, Stony Brook. NY, USA

FR-6:IL02 **Low Temperature Embrittlement and Fracture of Structural Materials "Before-During-After" Nuclear Reactor Irradiation**
V. CHERNOV, A.A. Bochvar Institute, Moscow, Russia

FR-6:L03 **Interstitial Loop Evolution in Alpha-Fe under Irradiation: Effects of C15 Cluster Stability and Loop One-dimensional Movement**
JIE GAO, E. GAGANIDZE, J. AKTAA, Karlsruhe Institute of Technology (KIT), Institute for Applied Materials, Eggenstein-Leopoldshafen, Germany

FR-6:L04 **Dislocation Sink Efficiencies for Di-interstitials in BCC (Fe, V) and FCC (Cu) Metals**
D.N. DEMIDOV, A.B. SIVAK, P.A. SIVAK, National Research Center "Kurchatov Institute", Moscow, Russia

FR-6:L05 **Effect of Simulation Technique on the High-dose Damage Evolution in Nuclear Materials**
F. GRANBERG, J. BYGGMÄSTAR, K. NORDLUND, Department of Physics, University of Helsinki, FINLAND; D.R. MASON, UK Atomic Energy Authority, Culham Science Centre, Oxfordshire, UK

FR-6:L06 **Numerical and Experimental Study of Stress Impact on Point Defect Absorption by Dislocations**
D. DA FONSECA, T. JOURDAN, Université Paris-Saclay, CEA, Service de Recherches de Métallurgie Physique, Gif-sur-Yvette, France; F. ONIMUS, Université Paris-Saclay, CEA, Service de Recherches Métallurgiques Appliquées, Gif-sur-Yvette, France; F. MOMPIOU, CEMES, CNRS et Université de Toulouse, Toulouse, France

FR-6:IL07 **Helium Induced Degradation Scenarios for Fusion Structural Steels**
A. BHATTACHARYA, Materials Science and Technology Division, Oak Ridge National Lab, Oak Ridge, TN, USA

FR-6:IL08 **Development of Small Specimen Test Technique for Master Curve Fracture Toughness Measurements of Eurofer97 and F82H**
XIANG CHEN, M.A. SOKOLOV, Y. KATOH, Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA; S. GONZALEZ DE VICENTE, International Atomic Energy Agency, Vienna, Austria

FR-6:IL09 **Material Selection of Accident Tolerant Fuel Cladding**
B.A. PINT, K.A. KANE, S.B. BELL, Materials Science and Technology Division, C.P. MASSEY, Nuclear Energy and Fuel Cycle Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA

FR-6:L10 **Phase Separation under Irradiation in Fe-Ni and Low-alloyed Steels**
Q. TENCE[1], E. MESLIN[1], M. NASTAR[1], I. MOUTON[2], B. DÉCAMPS[3], I. JOLIOT-CURIE[4], [1]Université Paris-Saclay, CEA, Service de Recherches de Métallurgie Physique, Gif-sur-Yvette, France; [2]Université Paris-Saclay, CEA, Service de Recherches de Métallurgie Appliquée, Gif-sur-Yvette, France; [3]Laboratoire de Physique des 2 infinis; [4](IJCLab), Université Paris-Saclay, Orsay, France

FR-6:L11 **MD-based Approach for Calculation of Radiation Defect Dipole Tensor and Its Application to Di-interstitials in BCC (Fe, V) and FCC (Cu) Crystals**
A.B. SIVAK, D.N. DEMIDOV, P.A. SIVAK, National Research Center "Kurchatov Institute", Moscow, Russia

FR-6:L12 **Ni Effect of Radiation-induced Segregation in FeMnNiCr HEA Alloys**
J. GAO[1], **E. MESLIN**[1], B. DÉCAMPS[2], A. FRACZKEWICZ[3], [1]CEA, Saclay, Gif-sur-Yvette, France; [2]IJC lab, Orsay University, France; [3]ESME, St Etienne, France

FR-6:IL13 **Critical Evaluation of High Temperature Helium Embrittlement Phenomena in Structural Materials**
S.J. ZINKLE[1, 2], ZEHUI QI[1], [1]University of Tennessee, Knoxville, TN, USA; [2]Oak Ridge National Laboratory, Oak Ridge, TN, USA

FR-6:IL14 **In-situ TEM of the Dynamics of Radiation-produced Defects**
KAZUTO ARAKAWA, NEXTA, Shimane University, Matsue, Japan

Session FR-7
Materials modelling and database

FR-7:IL01 **Modeling Grain Boundary Mediated Plasticity with Massively Parallel Atomistic Simulations**
T. FROLOV, Lawrence Livermore National Laboratory, Berkeley, CA, USA

FR-7:IL02 **Modeling of Hardening in Spinodally-decomposed Fe-Cr Alloys**
TOMOAKI SUZUDO, H. TAKAMIZAWA, Y. NISHIYAMA, Japan Atomic Energy Agency, Tokai-mura, Ibaraki, Japan; A. CARO, George Washington University, Ashburn, VA, USA; T. TOYAMA, Y. NAGAI, Tohoku University, Oarai, Ibaraki, Japan

FR-7:IL03 **Modeling Time-dependent Deformation Processes in Fe and W under Fusion First Wall Conditions**
QIANRAN YU, SHU HUANG, C. MCELFRESH, S. CHATERJEE, N. BERTIN, M. GILBERT, S. AUBRY, G. PO, S. DUDAREV, **J. MARIAN**, University of California Los Angeles, Los Angeles, CA, USA

FR-7:L04 **Atomistic Modeling of Primary Damage in Refractory W-Ta Solid Solution**
S. SEGANTIN, R. TESTONI, M. ZUCCHETTI, Dipartimento Energia, Politecnico di Torino, Torino, Italy

FR-7:L05 **Atomic Simulation of Structure in the Vicinity of Nanovoids and Evaluation of the Shifting Rates of the Void Surface Elements in Cubic Metals**
A.V. NAZAROV[1, 2], A.P. MELNIKOV[1], A.A. MIKHEEV[3], [1]National Research Nuclear University MEPhI, (Moscow Engineering Physics Institute), Moscow, Russia; [2]Institute for Theoretical and Experimental Physics named by A.I. Alikhanov of NRC «Kurchatov Institute», Moscow, Russia; [3]The Kosygin State University of Russia

FR-7:L06 **Atomistic Simulation of Point Defects Diffusion in Refractory Alloys**
S. STARIKOV, D. SMIRNOVA, M. MROVEC, R. DRAUTZ, Ruhr University Bochum, ICAMS, Bochum, Germany

Session FR-8
Crosscutting materials issues, present status, challenges and directions for nuclear fission and fusion science and technology

FR-8:IL01 **Challenges for Nuclear Fusion Science and Technology**
M. ABDOU, Mechanical and Aerospace Engineering Dept, University of California-Los Angeles, Los Angeles, CA, USA

FR-8:IL02 **Challenges for Fusion Materials and Potential Solutions**
J.W. COENEN[1, 2], Y. MAO[1], A. LITNOVSKY[1, 3], A. HOUBEN[1], V. GANESH[1], A. TERRA[1], D. DOROW-GERSPACH[1], J. RIESCH[4], R. NEU[4, 5], Ch. LINSMEIER[1], [1]Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung - Plasmaphysik, Partner of the Trilateral Euregio Cluster (TEC), Jülich, Germany; [2]Department of Engineering Physics, University of Wisconsin-Madison, Madison, WI, USA; [3]National Research Nuclear University MEPhI, Moscow, Russian Federation; [4]Max-Planck-Institut für Plasmaphysik, Garching, Germany; [5]Technische Universität München, Garching, Germany

FR-8:IL03 **Ion Irradiation as a Surrogate for Fission/Fusion Reactor Irradiation**
G.S. WAS[1], L. CLOWERS[1], Z. JIAO[1], S. TALLER[2], B. WIRTH[3], [1]University of Michigan, Ann Arbor, MI, USA; [2]Oak Ridge National Laboratory, USA; [3]University of Tennessee, USA

FR-8:IL04 **Powder Metallurgy Alloys for Fusion and Fission Science and Technology**
J.P. WHARRY[1], C.D. CLEMENT[1], S.S. PANUGANTI[1], Y. ZHAO[1], D.P. GUILLEN[2], D.W. GANDY[3], [1]School of Materials Engineering, Purdue University, West Lafayette, IN, USA; [2]Idaho National Laboratory, Idaho Falls, ID, USA; [3]Electric Power Research Institute, Charlotte, NC, USA

Focused Session FR-10
Materials Issues in Radioactive Nuclear Waste Treatment and Disposal

Session FR-10.1
Waste form development, including glass, ceramic, cement and metallic waste forms

FR-10.1:IL01 **Geopolymer Foam as Inorganic Monolithic Sorbent for the Decontamination of Liquid Radioactive Waste**
S. PETLITCKAIA, CEA, DES, ISEC, DE2D, SEAD, LCBC, Univ Montpellier, Marcoule, Bagnols sur Cèze, France; Y. BARRÉ, CEA, DES, ISEC, DMRC, STDC, LPSD, Univ Montpellier, Marcoule, Bagnols sur Cèze, France; J. VICENTE, Aix Marseille Univ, IUSTI, CNRS, UMR 7343, Marseille, France; **A. POULESQUEN**, CEA, DES, ISEC, DE2D, SEAD, LCBC, Univ Montpellier, Marcoule, Bagnols sur Cèze, France

FR-10.1:IL02 **Development of Zirconolite Ceramic Wasteforms for Pu Immobilisation**
L.R. BLACKBURN[1], L.J. GARDNER[1], A.R. MASON[1], SHI-KUAN SUN[2], E.R. MADDRELL[3], M.C. STENNETT[1], C.L. CORKHILL[1], N.C. HYATT[1], [1]University of Sheffield, UK; [2]Guangdong University of Technology, China; [3]National Nuclear Laboratory, UK

FR-10.1:IL03 **High-entropy A2B2O7-type Oxide Ceramics for the Immobilization of High-level Radioactive Waste**
GUO-JUN ZHANG, L. ZHOU, F. LI, J.-X. LIU, State Key Laboratory for Modification of Chemical Fibers and Polymer Materials, College of Materials Science and Engineering, College of Science, Institute of Functional Materials, Donghua University, Shanghai, China

FR-10.1:IL04 **Thermodynamic Stability, Radiation Damage and Leaching Effects in Tunnel Structured Hollandite Materials**
K. BRINKMAN, Materials Science and Engineering, Clemson University, Clemson, SC, USA

FR-10.1:IL05 **Recent Advances in the Immobilization of Low- or Intermediate-level Radioactive Waste in Cementitious Materials: Potential of Magnesium Potassium Phosphate Cements**
C. CAU DIT COUMES[1], G. PORAS[1], D. CHARTIER[1], D. LAMBERTIN[1], C. CANNES[2], S. DELPECH[2], S. PERRIN[1], [1]CEA, DES, ISEC, DE2D, SEAD, Univ Montpellier, Marcoule, France; [2]Institut de Physique Nucléaire, CNRS, Univ. Paris-Sud, Orsay, France

FR-10.1:IL06 **Actinides Separation over Lanthanides via Aluminium Cathode based Electrolysis in LiCl-KCl Eutectic**
WEIQUN SHI, Y. LIU, Y. ZHONG, D. YANG, Laboratory of Nuclear Energy Chemistry, Institute of High Energy Physics, CAS, Beijing, China

FR-10.1:IL07 **Investigation of Phosphate-based Wasteforms for the Immobilisation of Pyroprocessing Wastes**
D.J. BAILEY[1], L.J. GARDNER[1], M.C. STENNETT[1], D. MCKENDRICK[2], M.T. HARRISON[2], N.C. HYATT[1], [1]Immobilisation Science Laboratory, Department of Materials Science and Engineering, University of Sheffield, Sheffield, UK; [2]National Nuclear Laboratory, Central Laboratory, Sellafield, Seascale, Cumbria, UK

FR-10.1:IL08 **Adsorptivity and Radiation Resistance of Crown Ether Resins for Separation of Radionuclides**
MASANOBU NOGAMI, M. OYA, Kindai University, Higashi-Osaka, Osaka, Japan; T. SUZUKI, Nagaoka University of Technology, Nagaoka, Niigata, Japan; N. SATO, Kyoto University, Kumatori, Osaka, Japan

FR-10.1:L09 **Incorporation of Tetravalent Actinides in Monazite Structures**
A. ROCHE, S. SZENKNECT, A. MESBAH, N. CLAVIER, R. PODOR, N. DACHEUX, ICSM, UnivMontpellier, CEA, CNRS, ENSCM, Site de Marcoule, Bagnols-sur-Cèze, France

FR-10.1:L10 **Chemical Durability of A2B2O7 Pyrochlore and Fluorite Structure Types and Machine-learning Prediction**
JIE LIAN, Department of Mechanical, Aerospace, Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY, USA

FR-10.1:L11 **Understanding the Evolution of an Interface during the Dissolution of Nd-doped UO2 by Macro-/Microscopic Dual Approach**
T. BARRAL, L. CLAPAREDE, R. PODOR, N. DACHEUX, ICSM, UnivMontpellier, CEA, CNRS, ENSCM, Site de Marcoule, Bagnols-sur-Cèze, France

Session FR-10.2

Challenging waste constituents, such as actinides, noble metals, and volatile species

FR-10.2:IL01 **Challenges in the Management of Spent Nuclear Fuel**
G. LEINDERS, Belgian Nuclear Research Centre (SCK CEN), Fuel Materials, Institute for Nuclear Materials Science, Mol, Belgium

FR-10.2:IL02 **Development of Porous Silica-based Salt Adsorbents for Some Fission Products Removal from Liquid Waste**
YUEZHOU WEI, L. CHEN, University of South China, Hengyang, China; Y. WU, Shanghai Jiao Tong University, Shanghai, China

FR-10.2:IL03 **Removal of Polonium by SiO2 Nanofiber Filter for Lead Alloy-cooled Reactors**
XINPENG WANG, X. CHEN, X. CHEN, Guangxi University, Nanning, China

FR-10.2:IL04 **Glass-ceramic Waste Forms for Actinide Immobilization**
D.J. GREGG, Y. ZHANG, R. HOLMES, G. TRIANI, Australian Nuclear Science and Technology Organisation, Kirrawee DC, NSW, Australia

FR-10.2:L05 **Solid Fixation on Grafted Mesoporous Silica for Actinide Uptake**
C. REY, X. DESCHANELS, J. CAUSSE, ICSM, CEA, CNRS, Université de Montpellier, ENSCM, Bagnols-sur-Cèze, France; G. ZANTE, S. LE CAËR, Université Paris-Saclay, CEA, CNRS, NIMBE, UMR 3685, Gif-sur-Yvette, France; V. BOUNIOL, S. SENE, Y. GUARI, ICGM, Université de Montpellier, CNRS, ENSCM, Montpellier, France

FR-10.2:L06 **Fabrication and Characterization of Americium Transmutation Target Microspheres**
G. COLAK[1,2], G. LEINDERS1, A.R. DELVILLE[1], F. JUTIER[1], M. VERWERFT[1], J. VLEUGELS[2], [1]Belgian Nuclear Research Centre (SCK CEN), Institute for Nuclear Materials Science, Mol, Belgium; [2]KU Leuven, Department of Materials Engineering, Leuven, Belgium

Session FR-10.3

Waste form modeling, performance testing, and advanced characterization techniques

FR-10.3:IL01 **Characterization of Radiation Effects in Ceramics with Spallation Neutron Probes**
M. LANG, Department of Nuclear Engineering, University of Tennessee, Knoxville, TN, USA

FR-10.3:IL02 **Recent Experimental Evidence for the Suppression of the dissolution of spent nuclear fuel by H2 Gas**
Th. MENNECART[1], L. IGLESIAS PÉREZ[2], M. HERM[2], C. CACHOIR[1], K. LEMMENS[1], V. METZ[2], K. MEERT[3], [1]SCK CEN – Belgian Nuclear Research Centre, Mol, Belgium; [2]KIT-INE - Karlruhe Institute of Technology, Institute for Nuclear Waste Disposal, Eggenstein-Leopoldshafen, Germany; [3]ONDRAF/NIRAS - Belgian Agency for Radioactive Waste and Enriched Fissile Material, Bruxelles, Belgium

FR-10.3:IL03 **In-operando Raman Spectroscopy applied to the Understanding of MOX Fuel Alteration Mechanisms**
S. MIRO, C. JÉGOU, L. SARRASIN, M. TRIBET, V. BROUDIC, C. MARQUES, S. PEUGET, CEA, DES, ISEC, DE2D, Université de Montpellier, Marcoule, France

FR-10.3:IL04 **Machine Learning-accelerated Design for Advanced Nuclear Waste Form Development**
JIANWEI WANG, Louisiana State University, Baton Rouge, LA, USA

FR-10.3:IL05 **Radiation Damage and Corrosion of Single and Multi-phase Amorphous and Crystalline Solids**
ANAMUL HAQ MIR, MIAMI Irradiation Facility, School of Computing and Engineering, University of Huddersfield, UK

FR-10.3:IL06 **Long-term Matrix Corrosion of Spent Nuclear Fuels: Process Understanding derived from Single Effect Studies on Simplified Model Systems**
D. BOSBACH, Forschungszentrum Jülich, Jülich, Germany

Session FR-10.4

Materials issues in the design and operation of waste immobilization facilities

FR-10.4:IL01 **MAX Phases in Nuclear Material Applications**
CHENXU WANG, Peking University, Beijing, China

FR-10.4:IL02 **Production of Mixed Actinide Oxide Microparticle Reference Materials – Materials Science Aspects and Challenges**
S. NEUMEIER, P. KEGLER, S.K. POTTS, M. KLINKENBERG, D. BOSBACH, I. NIEMEYER, Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research - Nuclear Waste Management and Reactor Safety (IEK-6), Juelich, Germany; S. HAMMERICH, Heidelberg University, Institute of Earth Sciences, Heidelberg, Germany

FR-10.4:L03 **Synthesis of Silicotitanates for Sr Sorption – Influence of the Ti/Si Ratio**
T. TRATNJEK[1], J. CAUSSE[1], A. HERTZ[2], X. DESCHANELS[1], [1]Univ Montpellier, ICSM, CEA, CNRS, ENSCM, Marcoule, France; [2]CEA Marcoule, DES/ISEC/DE2D/SEAD/LPSD, Marcoule, France

FR-10.4:IL04 **Advanced Nuclear Waste Form Research at UCI**
S.C. FINKELDEI, University of California, Irvine, Department of Chemistry, Irvine, CA, USA

FR-10.4:IL05 **Nanoporosity and Irradiation - New Perspectives for the Treatment of Radioactive Effluents?**
J. LIN[1], G. TOQUER[1], C. GRYGIEL[2], S. DOURDAIN[1], Y. GUARI[3], C. REY[1], J. CAUSSE[1], **X. DESCHANELS**[1], [1]ICSM, CEA, CNRS, ENSCM, Univ Montpellier, Marcoule, France; [2]CIMAP, CEA-CNRS-ENSICAEN-UNICAEN, Caen, France; [3]ICGM, Univ Montpellier, CNRS, ENSCM, Montpellier, France

Poster Presentations

F:P01 **Additive Manufacturing Process of Microscale High-aspect Ratio Structures using Ceramic Resin for High Voltage and High Vacuum Applications**
K. KROL, W. NAWROT, D. NOWAK, K. LASZCZYK, Wroclaw University of Science and Technology, Faculty of Electronics, Photonics and Microsystems, Wroclaw, Poland

F:P02 **Production of Magnetically Soft Components from FeSi6.5 Alloy with Selective Laser Melting Technology - Optimisation, Prototyping and Post-processing**
B. JÓZWIK, A. KOLANO-BURIAN, P. ZACKIEWICZ, A. PILSNIAK, M. POLAK, A. BRUDNY, A. RADON, Łukasiewicz Research Network, Institute of Non-Ferrous Metals, Gliwice, Poland; A. WÓJCIK, Institute of Metallurgy and Materials Science, Polish Academy of Sciences, Krakow, Poland

F:P03 **Soft Magnetic Amorphous and Nanocrystalline Ribbons for Energy Conversion and Storage**
T. WARSKI[1,2], L. HAWELEK[1], A. RADON[1], A. PILSNIAK[1], A. KOLANO-BURIAN[1], M. POLAK[1], A. WOJCIK[3], [1]Lukasiewicz Research Network - Institute of Non-Ferrous Metals, Gliwice, Slaskie, Poland; [2]Silesian University of Technology, Gliwice, Slaskie, Poland; [3]Institute of Metallurgy and Materials Science of Polish Academy of Sciences, Krakow, Malopolskie, Poland

F:P04 **Morpho-structural Characterization of Polymer Embedded BaTiO2 and y-Fe2O3 Nano-structures**
L. MIHAI[1], **A. MARCU**[1], A. ROTARU[2], G. CARUNTU[2, 3], D. CARUNTU[2, 3], F. DUMITRACHE[1], A. CRIVEANU[1], L. GAVRILA-FLORESCU[1], M. ZAMFIRESCU[1], [1]National Institute for Laser Plasma and Radiation Physics, Magurele, Ilfov, Romania; [2]Department of Electrical Engineering and Computer Science & MANSiD Research Center, "Stefan Cel Mare" University, Suceava, Romania; [3]Department of Chemistry and Biochemistry, Central Michigan University, Mount Pleasant, MI, USA

F:P05 **Modelling a Combined Electrostatic – Triboelectric Flexible Generator**
S.E. HAIM, Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; C. JEAN-MISTRAL, Univ. Lyon, INSA-Lyon, CNRS UMR 5259, LaMCoS, Villeurbanne, France; A. SYLVESTRE, Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France

F:P06 **News Advances on ZnO Nanorods Arrays for Flexible and Transparent Supercapacitors**
E. NAVARRETE-ASTORGA, J. RODRÍGUEZ-MORENO, M. CRUZ LÓPEZ-ESCALANTE, J.J. PEINADO-PÉREZ, F. MARTÍN, **J. RAMOS-BARRADO**, Universidad de Málaga, Departamentos de Física Aplicada I & Ingeniería Química, Laboratorio de Materiales y Superficies, Málaga, Spain; E.A. DALCHIELE, Instituto de Física, Facultad de Ingeniería, Montevideo, Uruguay

F:P08 **Crystal and Magnetic Structure of (1-x)BiFeO3 – (x)BaTiO3 Ceramics**
M.V. SILIBIN[1], D.V. KARPINSKY[1, 2, 3], D.V. ZHALUDKEVICH[2], [1]National Research University of Electronic Technology "MIET", Zelenograd, Moscow, Russia; [2]Scientific-Practical Materials Research Centre of NAS of Belarus, Minsk, Belarus; [3]South Ural State University, Chelyabinsk, Russia

F:P09 **Polaron and Magnetoresistance Properties of Ag-doped ZnO Films**
A. KUZANYAN, S. HARUTYUNYAN, N. AGHAMALYAN, R. HOVSEPYAN, S. PETROSYAN, A. POGHOSYAN, A. SARKISYAN, **Y. KAFADARYAN**, Institute for Physicak Research of National Academy of Sciences of Armenia, Armenia

F:P10 **Spectral and Luminescence Investigation of Er,Yb,Ce-doped Ceramics of LiNbO3**
V.V. GALUTSKIY, I.G. PONETAEVA, K.V. PUZANOVSKIY, E.V. STROGANOVA, Kuban State University, Krasnodar, Russia

F:P11 **Nanostructured Si/Al MicroLEDs for VR/AR Applications**
A. SMIRNOV, Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus

F:P12 **Resistive Switching in V-doped Cr2O3 Thin Films Mott Insulator for Memory Applications**
M. RODRIGUEZ FANO, J. TRANCHANT, E. JANOD, B. CORRAZE, P.-Y. JOUAN, L. CARIO, M.-P. BESLAND, Université de Nantes, CNRS, Institut des Matériaux Jean Rouxel, Nantes, France

F:P13 **Influence of Thermal Oxidation Conditions on the Resistive Switching Behavior of WOx/HfO2 Bilayer Structures**
A.A. KOROLEVA, M.G. KOZODAEV, Y.Y. LEBEDINSKII, A.G. CHERNIKOVA, A.M. MARKEEV, Moscow Institute of Physics and Technology, Dolgoprudny, Russia

F:P14 **Effect of W Electrode Structure on Functional Properties of Ferroelectric Y:HfO2 Thin Films**
A. DMITRIYEVA, YU. LEBEDINSKII, A. ZENKEVICH, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow region, Russia

F:P15 **Crystallization of Ferroelectric Hf0.5Zr0.5O2 Films in Memory Capacitors by Large- or Local-area Pulsed Laser Annealing**
N. VOLODINA, A. ZENKEVICH, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow region, Russia; A. EGOROV, O. MAVRITSKY, Moscow Engineering Physics Institute, Moscow, Russia

F:P16 **Integration of Memristive Switching with Sensing in Ag Alloy Nanoparticle based Memsensors**
R. GUPTA[1], N. CARSTENS[1], M. TERASA[2], T. STRUNSKUS[1], F. FAUPEL[1], R. ADELUNG[2], A. VAHL[1], [1]Institute for Materials Science - Chair for Multicomponent Materials, Faculty of Engineering, Kiel University, Kiel, Germany; [2]Institute for Materials Science - Functional Nanomaterials, Faculty of Engineering, Kiel University, Kiel, Germany

F:P17 **Towards Photocatalytically Generated Long-range Connections for Artificial Neural Networks**
B. ADEJUBE[1], M. PAULSEN[2], J. SCHARDT[2], T. STRUNSKUS[1], F. FAUPEL[1], M. GERKEN[2], A. VAHL[1], [1]Institute for Materials Science - Chair for Multicomponent Materials, Faculty of Engineering, Kiel University, Kiel, Germany; [2]Institute of Electrical Engineering and Information Engineering - Chair for Integrated Systems and Photonics, Faculty of Engineering, Kiel University, Kiel, Germany

F:P18 **Carbon Modified TiO2 based Systems for Photochemical Applications**
A. ZOLLO, S. LIVRAGHI, Dipartimento di Chimica, Università di Torino, Torino, Italy

F:P19 **Characterization and Comparison of WO3 with Hybrid WO3-Mo and TiO2 with Hybrid TiO2-ZnO Nanostructures as Photoanodes**
P.J. NAVARRO-GÁZQUEZ[1], M. CIFRE-HERRANDO[1], G. ROSELLÓ-MÁRQUEZ[1], E. BLASCO-TAMARIT[1], M.J. MUÑOZ-PORTERO[1], D.M. GARCÍA-GARCÍA[1], R.M. FERNÁNDEZ-DOMENE[2], **J. GARCÍA-ANTÓN**[1], [1]Ingeniería Electroquímica y Corrosión (IEC), Instituto Universitario de Seguridad Industrial, Radiofísica y Medioambiental (ISIRYM), Universitat Politècnica de València, Valencia, Spain; [2]Departamento de Ingeniería Química, Universitat de Valencia, Burjassot, Spain

F:P20 **Improving the Longevity of Triboelectric Charge**
L. GERMANE[1], L. LAPČINSKIS[1, 2], M. KNITE[1], A. ŠUTKA[2], [1]Institute of Technical Physics, Faculty of Materials Science and Applied Chemistry, Riga Technical University, Riga, Latvia; [2]Institute of Materials and Surface Engineering, Faculty of Materials Science and Applied Chemistry, Riga Technical University, Riga, Latvia

F:P21 **Carbon-carbon Composite Membranes for Fuel Cells of Hydrogen Power Engineering**
V. MARTSENYUK, A. LYSENKO, Saint Petersburg State University of Industrial Technologies and Design, Saint Petersburg, Russia

F:P22 **The Influence of the Pre-heating Temperature and the Ultrasonic Vibration on the Structure of the NiTi Foams produced by Self-Propagating High-temperature Synthesis**
S. BELYAEV, N. RESNINA, D. CHEPELA, Saint-Petersburg State University, Saint-Petersburg, Russia; V. RUBANIK, V. RUBANIK, M. KULAK, Institute of technical acoustics of National Academy of Science of Belarus, Vitebsk, Belarus

F:P23 **Landau-energy Landscape Reconstruction for a Ni-Fe-Ga(Co) Shape Memory Alloy**
K. ZOUBKOVA, P. SEDLÁK, H. SEINER, Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic; E. VILLA, CNR ICMATE Sede di Lecco, Lecco, Italy; M. TAHARA, H. HOSODA, Institute of Innovative Research (IIR), Tokyo Institute of Technology, Yokohama, Japan; V. CHERNENKO, BCMaterials & University of Basque Country (UPV/EHU), Bilbao, Spain

F:P24 **Large Caloric Effects in Low Hysteresis Ni-Mn-Ga-Cu Ferromagnetic Shape Memory Alloy**
C. SEGUÍ, J. TORRENS, P. LÁZPITA*, **E. CESARI**, Dept. de Física, Universitat de les Illes Balears, Palma, Spain; *Depto. Electricidad y Electrónica, UPV-EHU, Leioa, Spain

F:P25 **Static and Dynamic Characterization of Flexinol Wires in a Biomimetic Perspective**
B. TONDU, Université Fédérale de Toulouse, and LAAS-CNRS, Toulouse, France

F:P26 **Shear Behavior under High Temperature Exposure of Epoxy-coated Carbon Textile-reinforced Mortar**
KYOUNG-KYU CHOI, Soongsil University, Seoul, South Korea

F:P27 **Fabrication and Characterisation of Double Layered Bone Scaffold**
L. YILDIZBAKAN[1], D. ABDULAZIZ[1], N. IQBAL[1], E. JONES[2], N. T. DO[3], P. V. GIANNOUDIS[4], A. JHA[1], [1]School of Chemical and Process Engineering, University of Leeds, Leeds, UK; [2]Clinical Sciences Building, St James University Hospital, School of Medicine, University of Leeds, Leeds, UK; [3]Division of Oral Biology, St James University Hospital, School of Medicine, University of Leeds, Leeds, UK; [4]Academic Department of Trauma and Orthopaedic, School of Medicine, University of Leeds, Leeds General Infirmary, Leeds, UK

F:P28 **Electrically Conductive Composite Materials based on Chitosan and Single-wall Carbon Nanotubes for Regenerative Technologies**
E. DRESVYANINA, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russia

F:P29 **Obtaining and Investigating the Properties of Bioresorbable Composite Materials for Bone Grafting**
N.A. TAGANDURDYEVA, E.N. DRESVYANINA, G.V. VAGANOV, I.P. DOBROVOLSKAYA, V.E. YUDIN, Peter the Great Saint-Petersburg Polytechnic University, Saint-Petersburg, Russia

F:P30 **A Hybrid Bluetooh-based Network Architecture for Outdoor and Home-monitoring of Human Mobility using Wearables**
E. CASILARI, C. CASTILLO-GUTIÉRREZ, J.M. CANO-GARCÍA et al., Universidad de Malaga, Malaga, Spain

F:P31 **Prelaminar Characterization of Advanced Alloys as Structural Material for LFR**
A. MELI, ESSENTIAL Group, DENERG, Politecnico di Torino, Torino, Italy; M. TARANTINO, S. BASSINI, A. FIORE, C. CIANTELLI, M. ANGIOLINI, D. MARTELLI, ENEA - Department for Fusion and Technology for Nuclear Safety and Security C. R. Brasimone, Camugnano (Bologna), Italy

F:P32 **W/Steel Composites as a Potential Interlayer for the Joining of W and Steel for the First Wall of a Fusion Reactor**
V. GANESH[1, 2], D. DOROW-GERSPACH[1], S. HEUER[1], L. LEICH[2], J. MATEJICEK[3], M. VILEMOVA[3], M. BRAM[2, 4], J. WILLEM COENEN[1, 5], M. WIRTZ[1], G. PINTSUK[1], W. THEISEN[2], C. LINSMEIER[1],
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F:P33 **Investigation of the Interaction of Liquid Tin-lithium Alloy with Austenitic Stainless Ssteel at High Temperatures**
Yu.V. PONKRATOV, I.L. TAZHIBAYEVA, V.S. BOCHKOV, Yu.N. GORDIENKO, Ye.Yu. TULUBAYEV, K.K. SAMARKHANOV, Ye.A. KOZHAKHMETOV, Zh.A. ZAURBEKOVA, Branch "Institute of Atomic Energy" NNC RK, Kurchatov, Kazakhstan; A.V. VERTKOV, JSC "Red Star", "Rosatom" State Corporation, Moscow, Russia

F:P34 **Nanostructured Mo Mirrors Behavior under He Irradiation**
L. CIUPINSKI[1], A.T. KRAWCZYNSKA[1], M. GLOC[1], D. SETMAN[2], M. SPYCHALSKI[1], P. PETERSSON[3], [1]Warsaw University of Technology, Faculty of Materials Science and Engineering, Warsaw, Poland; [2]University of Vienna, Faculty of Physics, Vienna, Austria; [3]KTH Physics Royal Institute of Technology, Stockholm, Sweden

F:P35 **Investigation of High-Temperature Corrosion Processes of the IGR Uranium-graphite Fuel using TGA and MS Complex Techniques**
K.K. SAMARKHANOV, Yu.N. GORDIENKO, Yu.Yu. BAKLANOVA, Yu.V. PONKRATOV, T.V. KULSARTOV, Zh.A. ZAURBEKOVA, V.S. BOCHKOV, Ye.Yu. TULUBAYEV, V.K. TSKHE, Ye.A. KOZHAKHMETOV, Institute of Atomic Energy Branch of the National Nuclear Center of the Republic of Kazakhstan, Kurkatov, Kazakhstan

F:P36 **Complex Thermo Gravimetric and Mass-spectrometric Studies of Non-irradiated Highly Enriched Uranium-graphite Fuel of the IGR**
Yu.N. GORDIENKO, V.S. BOCHKOV, Ye.T. KOYANBAYEV, T.V. KULSARTOV, Yu.V. PONKRATOV, K.K. SAMARKHANOV, Ye.Yu. TULUBAYEV, V.K. TSKHE, Ye.A. KOZHAKHMETOV, Institute of Atomic Energy Branch of the National Nuclear Center of the Republic of Kazakhstan, Kurchatov, Kazakhstan

F:P37 **Modeling of Interdiffusion and Kirkendall Effect on the Base of Alternative Theory of Interdiffusion**
V.A. MAKAROVA, National Research Nuclear University “MEPhI” (Moscow Engineering Physics Institute), Moscow, Russian Federation; A.V. NAZAROV, Institute for Theoretical and Experimental Physics named by A.I. Alikhanov of NRC "Kurchatov Institute", Moscow, Russia

F:P38 **Multiscale Modelling of Interdiffusion and Kirkendall Effect in System with Cubic Structure at Different Temperatures**
G.V. SERGEEV[1], V.A. MAKAROVA[1], A.V. NAZAROV[1, 2], [1]National Research Nuclear University “MEPhI” (Moscow Engineering Physics Institute), Moscow, Russian Federation; [2]Institute for Theoretical and Experimental Physics named by A.I. Alikhanov of NRC "Kurchatov Institute", Moscow, Russia