Sessions by Day

15th International Ceramics Congress

Perugia, Italy • June 20-24, **2022**

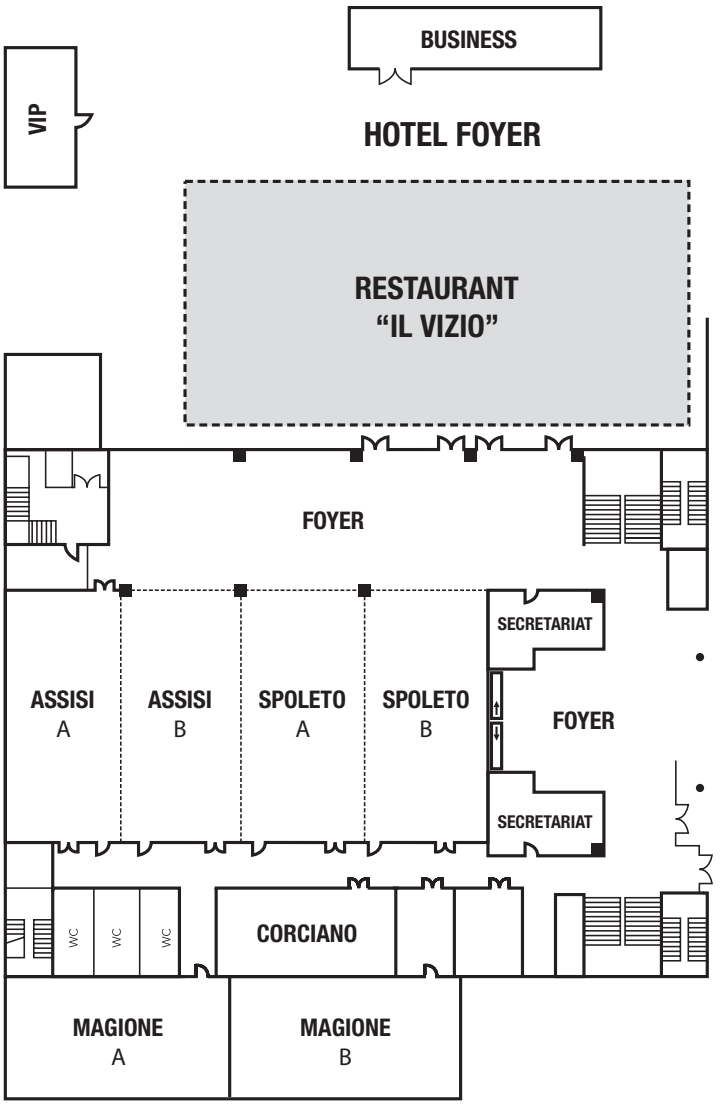
CIMTEC

CIMTEC2022

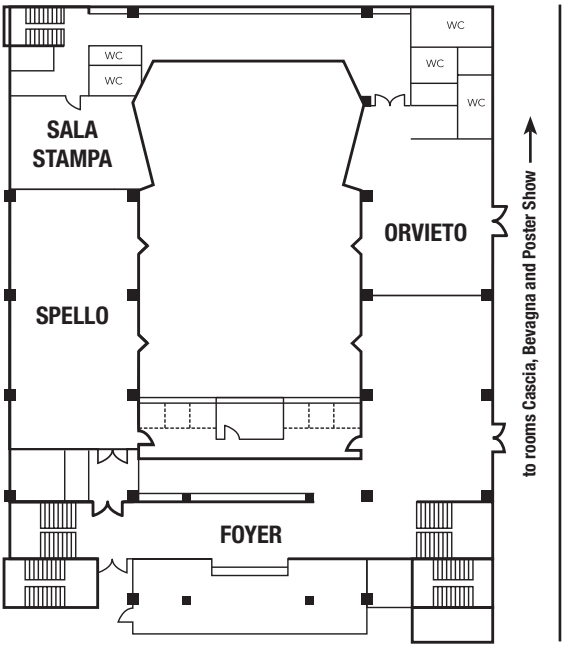
CIMTEC 2022

WELCOME RECEPTION CLOSURE DINNER

INDEX



Ground Floor

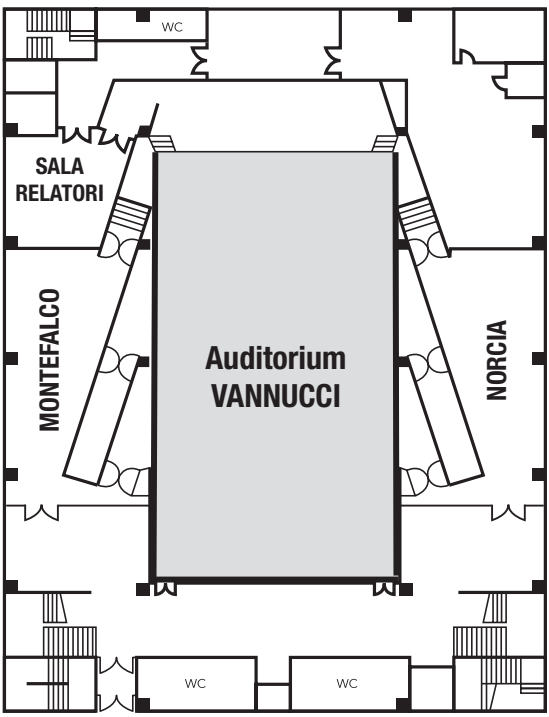


Level -1

RESTAURANT
"IL VIZIO UNDERGROUND"

POSTER
SHOW

Level -1



Level -2

Congress Outline

Symposium CA
Advances in Processing Science and Manufacturing of High Performance Ceramics and Composites

Focused Session ***CA-9***
Bio-inspired and Bio-enabled Processing

Focused Session ***CA-11***
SHS Ceramics

Focused Session ***CA-12***
Ceramic Joining: From Macro- to Nano-length Scales

Symposium CB
Big Data and Machine Learning Methods for Materials Advancements

Symposium CC
Modelling, Simulation and Testing of Mechanical and Thermomechanical Properties of Bulk Ceramics, Coatings and Composites

Symposium CD
High and Ultra High Temperature Ceramics and Composites for Extreme Environments

Symposium CE
Progress in Nano-laminated Ternary Carbides, Nitrides and Borides (MAX/MAB) Phases and Derivatives Thereof (MXenes)

Symposium CF
Advances in Functional Materials for Energy Harvesting, Storage and Solar Fuels

Symposium CG
Ceramic Thin Films and Coatings for Protective, Tribological and Multifunctional Applications

Symposium CH
Porous Ceramics for Environmental Protection, Energy-related Technologies and Advanced Industrial Cycles

Symposium CI
Progress in Electroceramics Research

Symposium CJ
Materials Demands Towards Next Generation Electrochemical Energy Storage Systems

Symposium CK
Solid Oxide Fuel Cells: Materials and Technology Challenges

Symposium CL
Inorganic Materials Systems for Advanced Photonics

Symposium CM
Development and Application of Functional Transparent Conducting and Semiconducting Oxides

Symposium CN
Geopolymers, Inorganic Polymers and Sustainable Materials

Symposium CO
Science and Technology for Silicate Ceramics

Symposium CP
Refractory Materials Challenges to Meet Current and Future Industry Needs

Serial Conferences

CQ
9th International Conference
Advanced Inorganic Fibre Composites for Structural and Thermal Management Applications

CR
9th International Conference
Science and Engineering of Novel Superconductors

Meeting Rooms by Symposia

OPENING SESSION ..... AUDITORIUM

Symposium CA ..... ASSISI A / MAGIONE A

Symposium CB ..... SALA STAMPA

Symposium CC ..... SALA STAMPA

Symposium CD ..... MAGIONE B

Symposium CE ..... ASSISI B

Symposium CF ..... SPOLETO A

Symposium CG ..... SPOLETO B

Symposium CH ..... SPOLETO B / SALA RELATORI

Symposium CI ..... MAGIONE A

Symposium CJ ..... ORVIETO

Symposium CK ..... ORVIETO / MAGIONE B

Symposium CL ..... CORCIANO

Symposium CM ..... MONTEFALCO

Symposium CN ..... MONTEFALCO / SALA RELATORI

Symposium CO ..... SPELLO

Symposium CP ..... SPELLO / CORCIANO

Conference CQ ..... NORCIA

Conference CR ..... SALA RELATORI

Meetings with restricted participation

World Academy of Ceramics-Advisory Board
Wednesday June 22 17.30-18.30 ..... BUSINESS

IEB Ceramics International
Thursday June 23 17.00-18.00..... MAGIONE B

Special Workshop

French-Italian bilateral Workshop on
Ceramic Matrix Composites
Saturday June 25 09.30-12.30..... CORCIANO

Events by Day

Monday June 20

15.00-19.00

REGISTRATION
Centro Congressi Hotel Quattrotorri
at Best Western Hotel Quattrotorri Perugia
Via Corcianese 260
Perugia - Italy

Tuesday June 21

Morning: 9.30-13.15

Opening Session

Welcome Addresses

10.00 - 10.45
Formal Induction of the New
Members of the World Academy
of Ceramics (18th and 19th Election)

10.45 - 11.00
World Academy of Ceramics
International Ceramics Prize 2020 Award

Plenary Lectures (C:PL1-PL3)

Tuesday June 21

Afternoon: 14.25-19.00

Symposium CA	(CA-1:IL01-IL02) (CA-1:IL05-L10)
Symposium CD	(CD-1:IL01-IL03) (CD-1:IL05-L06)
Symposium CE	(CE-1:IL01-IL02) (CE-1:L04-L08)
Symposium CF	(CF-1:IL01-IL04) (CF-1:IL06) (CJ-1:IL08-IL09)
Symposium CG	(CG-1:IL01-IL03) (CG-1:L04-L06)
Symposium CI	(CI-1:IL01-IL02) (CI-1:IL04-L10)
Symposium CK	(CK-1:IL03-IL05) (CK-1:L06-L08)
Symposium CL	(CL-1:IL01-IL02) (CL-1:L05-L07)
Symposium CM	(CM-1:IL01-IL03)
Symposium CN	(CN-1:IL01-IL06)
Symposium CP	(CP-1:IL01-IL02) (CP-2:IL01-L04)
Conference CQ	(CQ-1:IL01-L04) (CQ-2:IL01-IL02)
Conference CR	(CR-2:IL01-IL02) (CR-3:IL08)

14.30-18.30
POSTER MOUNTING

20.30 - 22.00
Welcome Party

Wednesday June 22

Morning: 9.00-13.00

Symposium CA	(CA-1:L12-L14) (CA-2:IL01) (CA-9:IL01-IL04)
Symposium CB	(CB-1:KL1+CB-1:IL01-IL04) (CB-1:IL06-L09)
Symposium CD	(CD-1:IL07-L10) (CD-1:IL11-L14)
Symposium CE	(CE-2:IL01-L05) (CE-2:L07-L09)
Symposium CF	(CF-1:L10-L12) (CF-1:IL14-IL16)
Symposium CG	(CG-2:IL01-IL09) (CG-2:IL10-IL13)
Symposium CI	(CI-2:IL04-IL10) (CI-2:L13-L22) (CI-3:IL02)
Symposium CJ	(CJ-1:IL02-IL03) (CJ-1:IL05-IL06)
Symposium CL	(CL-2:IL02-L07) (CL-3:IL05)
Symposium CN	(CN-1:IL07-L12) (CN-2:L04-L08)
Symposium CP	(CP-3:IL01-IL02) (CP-4:IL01-L04)
Conference CQ	(CQ-2:IL03-L04) (CQ-3:IL01-IL04)
Conference CR	(CR-3:IL02-IL05) (CR-3:IL06-IL10)

Wednesday June 22

Afternoon: 14.30-19.00

Symposium CA	(CA-9:IL06-L09) (CA-4:IL01-IL04)
Symposium CC	(CC-3:IL06) (CC-1:IL01-IL02) (CC-1:IL03-IL08)
Symposium CD	(CD-2:IL01-IL03) (CD-2:IL05-L06)
Symposium CE	(CE-3:IL01-L05) (CE-3:IL06-L10)
Symposium CF	(CF-1:IL18-L21)
Symposium CH	(CH-1:IL01-IL04) (CH-1:IL05-IL11)
Symposium CK	(CK-2:IL01-IL05) (CK-2:IL08-L11)
Symposium CL	(CL-4:IL01-IL03) (CL-4:IL04-IL05)
Symposium CM	(CM-1:IL04-IL09) (CM-2:IL02)
Symposium CP	(CP-3:IL04-IL05) (CP-5:IL02-IL04)
Conference CQ	(CQ-3:IL06-L09) (CQ-4:L03-IL05)
Conference CR	(CR-4:IL01-IL02) (CR-5:IL01) (CR-6:IL01-IL02)

Thursday June 23

Morning: 9.00-13.00

Symposium CA	(CA-3:IL01-L08) (CA-6:KL+CA-6:IL01) (CA-11.2:L03-L05) (CA-11.2:IL06-IL07) (CA-11.3:IL06)
Symposium CB	(CB-2:KL1-KL2) (CB-2:IL04-IL09)
Symposium CD	(CD-2:IL08-IL11) (CD-3:IL01-L08)
Symposium CE	(CE-4:IL02-IL03) (CE-4:L04-IL05)
Symposium CF	(CF-1:IL05) (CF-2:IL01-IL03) (CF-2:IL06-IL07)
Symposium CG	(CG-3:IL01-IL08) (CG-3:IL09-IL11)
Symposium CJ	(CJ-1:IL11-IL14) (CJ-1:IL15-IL16)
Symposium CM	(CM-2:IL04-IL06) (CM-2:IL07-IL09)
Symposium CN	(CN-3:IL01-L04) (CN-3:IL06-L07)
Symposium CO	(CO-1:IL01-L04) (CO-3:IL01-IL03)
Symposium CP	(CP-6:IL01-IL03) (CP-6:IL04-L07)
Conference CQ	(CQ-4:IL07-L10) (CQ-5:IL02-IL03)

Thursday June 23

Afternoon: 14.30-19.00

Symposium CA	(CA-6:IL03-L12) (CA-5:IL02-L07)
Symposium CC	(CC-1:L10-L12) (CC-1:IL15-IL16)
Symposium CE	(CE-5:IL01-L05) (CE-5:IL06-L09)
Symposium CH	(CH-2:IL01-IL03) (CH-3:IL02-IL05)
Symposium CI	(CI-3:IL01-IL03)
Symposium CK	(CK-3:IL01-L05) (CK-4:IL03-IL06)
Symposium CL	(CL-1:IL04) (CL-5:IL01-IL02) (CL-5:IL03-IL05)
Symposium CM	(CM-2:IL10-IL11) (CM-3:IL01-IL03)
Symposium CO	(CO-1:IL05-L07) (CO-2:IL01-L05)
Conference CQ	(CQ-6:IL01-IL03)

Friday June 24

Morning: 9.00-13.00

Symposium CA	(CA-5:IL06-L13) (CA-7:IL02-L08) (CA-12.1:IL01) (CA-12.2:IL01-L06)
Symposium CC	(CC-2:IL02) (CC-3:IL01-IL05)
Symposium CD	(CD-4:IL01-IL04)
Symposium CE	(CE-6:IL04-L06) (CE-7:L01-IL05)
Symposium CF	(CF-2:L11-L16) (CF-3:L03) (CF-2:IL10)
Symposium CG	(CG-4:IL01-IL04) (CG-4:IL05-IL12)
Symposium CH	(CH-4:IL02) (CH-5:IL02-L04) (CH-6:IL02)
Symposium CI	(CI-1:IL08) (CI-4:IL01-IL03)
Symposium CJ	(CJ-1:IL22-IL25) (CJ-1:IL26-L28) (CJ-2:IL06)
Symposium CK	(CK-5:IL02-IL05)
Symposium CL	(CL-6:IL01-IL06) (CL-7:L04-IL08)
Symposium CN	(CN-3:IL08-IL09) (CN-4:IL01-IL02) (CN-4:L03-IL07)
Symposium CO	(CO-3:IL06-IL07) (CO-4:IL01-L08)

Friday June 24

Afternoon: 14.30-17.00

Symposium CP (CP-6:IL09)
(CP-7:IL03)
(CP-8:IL01-L03)

14.30-17.00
POSTER DISCUSSION

20.30-23.00
Conference Dinner

SESSIONS FLOWSHEET

June 20-24

15th International Ceramics Congress

Chair

Pietro Vincenzini
World Academy of Ceramics
National Research Council, Italy

Co-Chairs

Mrityunjay Singh
Ohio Aerospace Institute, Cleveland, USA
World Academy of Ceramics

Suk-Joong L. Kang
KAIST, South Korea
International Ceramic Federation

Conveners

Symposium CA: **Rajendra K. Bordia**, USA

Focused Session CA-9: **Masahiro Yoshimura**, Taiwan

Focused Session CA-11: **Alexander Mukasyan**, USA

Focused Session CA-12: **Monica Ferraris**, Italy

Symposium CB: **Fadi Abdeljawad**, USA

Symposium CC: **Pavol Sajgalik**, Slovakia

Symposium CD: **William G. Fahrenholtz**, USA

Symposium CE: **Michel W. Barsoum**, USA

Symposium CF: **Sanjay Mathur**, Germany

Symposium CG: **Shrikant Josh**i, Sweden &
Sanjay Sampath, USA

Symposium CH: **Paolo Colombo**, Italy

Symposium CI: **Masaki Azuma**, Japan

Symposium CJ: **Steve G. Greenbaum**, USA

Symposium CK: **Massimiliano Lo Faro**, Italy

Symposium CL: **Maurizio Ferrari**, Italy

Symposium CM: **Julia E. Medvedeva,** USA

Symposium CN: **Vilma Ducman**, Slovenia

Symposium CO: **Michele Dondi**, Italy

Symposium CP: **Jinichiro Nakano**, USA **&**
Victor C. Pandolfelli, Brazil

Conference CQ: **Mrityunjay Sing**h, USA

Conference CR: **Davor Pavuna**, Switzerland

OPENING SESSION

AUDITORIUM

Pietro VINCENZINI
General Chair CIMTEC Conferences

Chair:

Mrityunjay SINGH, USA

9.30 - 10.00

Welcome Addresses

Mrityunjay SINGH
World Academy of Ceramics

Suk-Joong L. KANG
International Ceramic Federation

10.00 - 10.45

Formal induction of the New Members of the World Academy of Ceramics (18th and 19th Election)

10.45 - 11.00

World Academy of Ceramics
International Ceramics Prize 2020 Award

Plenary Lectures

11.00 - 11.45

C:PL1

High-Pressure Materials Synthesis - A Guideline for the Discovery of Advanced Ceramic Nitrides

Ralf RIEDEL
Dept. of Dispersive Solids, Institute of Materials Sciences, Technical University of Darmstadt, Darmstadt, Germany
(World Academy of Ceramics Prize Laureate Lecture)

11.45 - 12.30

C:PL2

Removing Roadblocks and Opening New Opportunities for MXenes

Michel BARSOUM[1] and Yury GOGOTSI[1, 2]
[1]Dept. of Materials Science and Engineering, Drexel University, Philadelphia, PA, USA; [2]A.J. Drexel Nanomaterials Institute, Dept. of Materials Science and Engineering, Drexel University, Philadelphia, PA, USA
(World Academy of Ceramics Prize Laureates Lecture)

12.30 - 13.15

C:PL3

C-Axis Aligned Crystalline Indium-Gallium-Zinc Oxide Ceramics and Oxide Semiconductor LSI as Countermeasures against Global Warming

Shunpei YAMAZAKI, K. KATO, T. ONUKI, D. SHIMADA, H. KIMURA, F. ISAKA, R. HODO, H. BABA, T. NAKAYAMA, H. KUNITAKE, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Kanagawa, Japan

SYMPOSIUM CA

ADVANCES IN PROCESSING SCIENCE AND MANUFACTURING OF HIGH PERFORMANCE CERAMICS AND COMPOSITES

Room: **ASSISI A**

Chair: Rajendra K. BORDIA, USA *(Convener)*

14.25 *Welcome*

14.30 *CA-1:IL01* **Full Densification in Sintering, How can we Achieve it?**
SUK-JOONG L. KANG, KAIST, Daejeon, South Korea

15.00 *CA-1:IL02* **Transparency in Polycrystalline Ceramics: Trivial Process or Nightmare?**
A. LERICHE, Y. LORGOUILLOUX, LMCPA - UPHF, Valenciennes, France; J. BOEHLMLER, S. LEMONNIER, ISL, St Louis, France

15.30 *Break*

Chair: Suk-Joong L. KANG, South Korea

16.00 *CA-1:IL05* **Towards High-performance all Solid State Batteries: Where Processing Comes into Play**
O. GUILLON, Forschungszentrum Jülich GmbH, IEK-1, Jülich, Germany

16.30 *CA-1:L06* **A Comprehensive Approach to Ceramic Forming Processes**
W.M. CARTY, Alfred University, Alfred, NY, USA

16.50 *CA-1:L07* **Efficient Optimization of Debinding Processes**
H. FRIEDRICH, H. ZIEBOLD, F. RAETHER, Fraunhofer ISC, Zentrum für Hochtemperatur-Leichtbau HTL, Bayreuth, Germany

17.10 *CA-1:L10* **Improved Sintered Density at reduced Sintering Temperature: New Ceramic Body for 99,8%-Al_2O_3 Engineering Ceramics from Nabaltec AG**
A. BIEGERL, Nabaltec AG, Schwandorf, Germany

SYMPOSIUM CD

HIGH AND ULTRA HIGH TEMPERATURE CERAMICS AND COMPOSITES FOR EXTREME ENVIRONMENTS

Room: **MAGIONE B**

Chair: William G. FAHRENHOLTZ, USA *(Convener)*

14.25 *Welcome*

14.30 *CD-1:IL01* **Ceramic Matrix Composites for Application in Aeroengines**
D. KOCH, Institute of Materials Resource Management MRM, University of Augsburg, Augsburg, Germany

15.00 *CD-1:IL02* **Processing of Sintered and Non-sintered UHTCMCs for Extreme Environments**
D. SCITI, A. VINCI, P. GALIZIA, S. FAILLA, F. SERVADEI, L. ZOLI, CNR-ISTEC, National Research Council of Italy - Institute of Science and Technology for Ceramics, Faenza, Italy

15.30 *CD-1:IL03* **Synthesis and Properties of Boron Nitride Nanostructures**
C. REBHOLZ[1], N. KOSTOGLOU[2], B, MATOVIC[3], [1]Department of Mechanical & Manufacturing Engineering, University of Cyprus, Nicosia, Cyprus; [2]Department of Materials Science, Montanuniversität Leoben, Leoben, Austria; [3]Vinča Institute of Nuclear Sciences, University of Belgrade, Belgrade, Serbia

16.00 *Break*

Chair: Dietmar KOCH, Germany

16.30 *CD-1:IL05* **Ultra-high Temperature Ceramic Matrix Composites (UHTCMCs) Made by RF Enhanced Chemical Vapour Infiltration (RF-CVI)**
V. VENKATACHALAM, J. BINNER, School of Metallurgy and Materials, University of Birmingham, UK

17.00 *CD-1:L06* **Colloidal Processing of Nano-nickel Doped WC Compacts for Improved Hot Press and Pressureless Sintering**
E.M. GARCIA AYALA, Z. GONZALEZ, B. FERRARI, **A.J. SANCHEZ-HERENCIA**, ICV-CSIC, Madrid, Spain; J.Y. PASTOR, Univ. Polytech. Madrid, Spain; L. SILVESTRONI, ISTEC-CNR, Faenza, Italy

SYMPOSIUM CE

PROGRESS IN NANO-LAMINATED TERNARY CARBIDES, NITRIDES AND BORIDES (MAX/MAB) PHASES AND DERIVATIVES THEREOF (MXENES)

Room: **ASSISI B**

Chair: Michel W. BARSOUM, USA *(Convener)*

14.25 *Welcome*

14.30 *CE-1:IL01* **Chemically Ordered Laminate Borides and their Two-dimensional Derivatives from Chemical Exfoliation**
J. ROSEN, Materials Design, Department of Physics, Chemistry and Biology (IFM), Linköping University, Linköping, Sweden

15.00 *CE-1:IL02* **New Solid Solution MAX Phases**
B. TUNCA, K. VAN LOO, **J. VLEUGELS**, KU Leuven, Department of Materials Engineering, Heverlee, Belgium; K. LAMBRINOU, SCK CEN, Mol, Belgium & University of Huddersfield, School of Computing and Engineering, Huddersfield, UK

15.30 *Break*

Chair: Jozef VLEUGELS, Belgium

16.00 *CE-1:L04* **Investigation of Two-dimensional Boridene from First Principles and Experiments**
P. HELMER[1], J. HALIM[1], J. ZHOU[1], R. MOHAN[2], B. WICKMAN[2], J. BJÖRK[1], J. ROSEN[1], [1]Materials Design Division, Department of Physics, Chemistry and Biology, IFM, Linköping University, Linköping, Sweden; [2]Chemical physics, Department of Physics, Chalmers University of Technology, Gothenburg, Sweden

16.20 *CE-1:IL05* **Theoretical and Experimental Exploration for Expanding the Elemental Space of Chemically Ordered and Disordered MAX and MAB Phases**
M. DAHLQVIST, J. ROSEN, Materials Design Division, Department of Physics, Chemistry, and Biology (IFM), Linköping University, Linköping, Sweden

16.50 *CE-1:L07* **Theoretical Stability Predictions of Orthorhombic and Hexagonal Ternary MAB Phases**
A. CARLSSON, J. ROSÉN, M. DAHLQVIST, Materials Design Division, Department of Physics, Chemistry, and Biology (IFM), Linköping University, Linköping, Sweden

17.10 *CE-1:L08* **Chemical Exfoliability of MAX Phases in Hydrogen Fluoride Studied from First Principles**
J. BJÖRK, J. HALIM, J. ZHOU, J. ROSEN, Materials Design Division, Department of Physics, Chemistry and Biology (IFM), Linköping University, Sweden

SYMPOSIUM CF

ADVANCES IN FUNCTIONAL MATERIALS FOR ENERGY HARVESTING, STORAGE AND SOLAR FUELS

Room: **SPOLETO A**

Chair: Sanjay MATHUR, Germany *(Convener)*

14.25 *Welcome*

14.30 *CF-1:IL01* **Nano-structured Oxide Sponges; From Precursor to Complex Oxides**
G. WESTIN, S.N. KATEA, Department of Chemistry-Ångström, Ångström laboratory, Uppsala, Sweden

15.00 *CF-1:IL02* **Metal-organic Frameworks-based Biocomposites: Design, Synthesis and Biomedical Applications**
P. FALCARO, M. VELASQUEZ-HERNANDEZ, Graz University of Technology, Institute of Physical and Theoretical Chemistry, Graz, Austria

15.30 *CF-1:IL04* **Nanostructuring and Nanocomposites in Thermoelectric Oxides**
F. GIOVANNELLI, C. CHEN, F. DELORME, Université de Tours, CNRS, INSA CVL, GREMAN UMR 7347, IUT de Blois, Blois Cedex, France

16.00 *Break*

Chair: Fabien GIOVANNELLI, France

16.30 *CF-1:IL06* **Nanostructures and Thin Films of Tetragonal Tungsten Bronze Complex Oxides**
V. DEMANGE, B. ASPE, A. WAROQUET, V. DORCET, M. GUILLOUX-VIRY, ISCR, France; Q. SIMON, GREMAN, Blois, France; B. GAUTIER, D. ALBERTINI, INL, Lyon, France; R. SAULEAU, X. CASTEL, IETR, Rennes, France

SYMPOSIUM CJ

MATERIALS DEMANDS TOWARDS NEXT GENERATION ELECTROCHEMICAL ENERGY STORAGE SYSTEMS

17.00 *CJ-1:IL08* **New Hydrides and Halides as Solid Electrolytes for Metal Ion Batteries**
D.H. GREGORY, School of Chemistry, University of Glasgow, Glasgow, UK

17.30 *CJ-1:IL09* **Research Progress on Anode-free Lithium Metal Batteries**
BING JOE HWANG, National Taiwan University of Science and Technology, Taipei, Taiwan

SYMPOSIUM CG

CERAMIC THIN FILMS AND COATINGS FOR PROTECTIVE, TRIBOLOGICAL AND MULTIFUNCTIONAL APPLICATIONS

Room: **SPOLETO B**

Chair: Shrikant JOSHI, Sweden *(Convener)*

14.25 *Welcome*

14.30 *CG-1:IL01* **Ionized and Hybrid Plasma Deposition Processes**
H. BARANKOVA, L. BARDOS, Angstrom Laboratory, Uppsala University, Sweden and BB Plasma Design AB, Uppsala, Sweden

15.00 *CG-1:L02* **Deposition of Ge-Sb-Te Thin Films by Radio-frequency Magnetron Co-sputtering**
M. BOUŠKA[1], T. HALENKOVIČ[1], V. NAZABAL[2, 1], M. BAILLIEUL[1], J. GUTWIRTH[1], M. KOTRLA[1], **P. NEMEC**[1], [1]Department of Graphic Arts and Photophysics, Faculty of Chemical Technology, University of Pardubice, Pardubice, Czech Republic; [2]Institut des Sciences Chimiques de Rennes, UMR CNRS 6226, Université de Rennes 1, Rennes, France

15.20 *CG-1:IL03* **New Surface Boriding Technologies**
M. MEJAUSCHEK, H. PASCHKE, M. WEBER, HERRMANN, Fraunhofer Institute for Surface Engineering an Thin Films IST, Braunschweig, Germany; P. KAESTNER, J. VOGTMANN, Institute for Surface Technology, Braunschweig, Germany

15.50 *Break*

Chair: Hana BARANKOVA, Sweden

16.20 *CG-1:L04* **Plasma Electrolytic Oxidation for the Formation of Thin Primer Coatings on Structural Aluminium Components for Automotive Applications**
D. SHORE[1], J.C. AVELAR-BATISTA WILSON[2], A. MATTHEWS[1], A. YEROKHIN[1], [1]Department of Materials, The University of Manchester, Oxford Road, Manchester, UK; [2]BCW Manufacturing Group Ltd, Burnley, Lancashire, UK

16.40 *CG-1:L05* **Dynamic Voltammetry Diagnostics of Electrolytic Plasma Processes for Deposition of Ceramic Coatings of Valve Metal Substrates**
A. YEROKHIN, Department of Materials and Henry Royce Institute for Advanced Materials and Innovation, University of Manchester, UK

17.00 *CG-1:L06* **Oxidation Resistance of SiAlOC Coated Chromium**
N.C. PETRY[1], M. BIK[2], A.S. ULRICH[1], M. SITARZ[2], M. LEPPLE[1], M.C. GALETZ[1], [1]DECHEMA-Forschungsinstitut, Frankfurt am Main, Hesse, Germany; [2]AGH University of Science and Technology, Krakow, Poland

17.20 *CG-1:L09* **Advanced Iron Boride Coatings for Geothermal Power Generation**
E. MEDVEDOVSKI[1], G. LEAL MENDOZA[1], **G. RAVIER**[2], A. GENTER[2], [1]Endurance Technologies Inc.; [2]ES Geothermie, Mundolsheim, France

SYMPOSIUM CI

PROGRESS IN ELECTROCERAMICS RESEARCH

Room: **MAGIONE A**

Chair: Masaki AZUMA, Japan *(Convener)*

14.25 *Welcome*

14.30 *CI-1:IL01* **Two Approaches to Develop Ultra-low Permittivity Ceramics for High Frequency Applications**
M. NELO, **H. JANTUNEN**, Microelectronics Research Unit, Faculty of Information Technology and Electrical Engineering, University of Oulu, Oulu, Finland

15.00 *CI-1:IL02* **Glasses and Glass Ceramics: Properties and Applications in Microwave Electronics**
M. LETZ, SCHOTT AG, Mainz, Germany

15.30 *Break*

Chair: Heli Maarit JANTUNEN, Finland

16.00 *CI-1:IL04* **Anomalous Domain Wall Motion in Cu-Cl Boracite: Implication for Negative Capacitance**
C. COCHARD[1, 2], J.G.M. GUY[1], R.W. WHATMORE[3], M. CONROY[4], K. MOORE[4], A. HARVEY[4], U. BANGERT[4], A. KUMAR[1], Ra.G.P. McQUAID[1], J.M. GREGG[1], [1]Centre for Nanostructured Media, School of Mathematics and Physics, Queen's University Belfast, Belfast, UK; [2]School of Science and Engineering, University of Dundee, Dundee, UK; [3]Department of Materials, Imperial College London, London, UK; [4]Department of Physics, School of Sciences and Bernal Institute, University of Limerick, Limerick, Ireland

16.30 *CI-1:L06* **Unexpected Electrical Breakdown Processes in Metal-Aluminumoxide-Metal Structures**
H. KLIEM, K. FALIYA, Institute of Electrical Engineering Physics, Saarland University, Saarbruecken, Germany

16.50 *CI-1:L10* **Magnetodielectric and Electromagnetic Wave Absorption Properties of Ceramic Nanocomposites based on the Magnetically Soft, Semi-hard and Hard Ferrites**
A. RADON, P. WLODARCZYK, L. HAWELEK, M. POLAK, A. KOLANO-BURIAN, Łukasiewicz Research Network, Institute of Non-Ferrous Metals, Gliwice, Poland

SYMPOSIUM CK

SOLID OXIDE FUEL CELLS: MATERIALS AND TECHNOLOGY CHALLENGES

Room: **ORVIETO**

Chair: Massimiliano LO FARO, Italy *(Convener)*

14.25 *Welcome*

14.30 *CK-1:IL03* **Nanoscale Investigation of Long-term Operated Solid Oxideelectrolysis Cells**
J. VILLANOVA, ESRF The European Synchrotron, Grenoble Cedex, France; S. SCHLABACH, Institute for Applied Materials and Karlsruhe Nano Micro Facility, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; A. BRISSE, **A. LEON**, European Institute for Energy Research, Karlsruhe, Germany

15.00 *CK-1:IL05* **Hydride Superionic Conduction in Ba1.75LiH2.7O0.9**
GENKI KOBAYASHI, Institute for Molecular Science, National Institutes of Natural Sciences, Okazaki, Japan

15.30 *Break*

Chair: Genki KOBAYASHI, Japan

16.00 *CK-1:L06* **Modulating the Composition of Bimetallic Fe-Ni Exsolved Nanoparticles**
A. TSIOTSIAS[1, 2], B. EHRHARDT[1], B. RUDOLPH[1], L. NODARI[3], SEUNGHYUN KIM[4], WOOCHUL JUNG[4], N. CHARISIOU[2], M. GOULA[2], **S. MASCOTTO**[1], [1]Institut für Anorganische und Angewandte Chemie, Universität Hamburg, Hamburg, Germany; [2]Department of Chemical Engineering, University of Western Macedonia, Koila, Kozani, Greece; [3]Department of Chemical Science, University of Padua, Padova, Italy; [4]Department of Materials Science and Engineering, KAIST, Daejeon, South Korea

16.20 *CK-1:L07* **High Temperature Mechanical Properties of Zirconia Thin Ceramic Foils for SOFCs**
I. BOMBARDA, F. DÖMLING, T. LIENSDORF, C. SITZMANN, N. LANGHOF, S. SCHAFFÖNER, Universität Bayreuth, Bayreuth, Germany

16.40 *CK-1:L08* **Mono Solid Oxide Fuel Cell Based on Calcium Aluminate obtained by Functionally Gradient Materials Process**
V.C. SOUSA[1], F.C.T. VEIGA[1], J.J. EGEA[2], S.S. CAVA[3], [1]UFRSG/ PPGE3M/LABCAV, Porto Alegre, RS, Brazil; [2]CSIC/ UFRSG-(CNPQ/ Research PVE), Brazil; [3]UFPEL/CCAF, Brazil

SYMPOSIUM CL

INORGANIC MATERIALS SYSTEMS FOR ADVANCED PHOTONICS

Room: **CORCIANO**

Chair: Maurizio Ferrari, Italy *(Convener)*

14.25 *Welcome*

14.30 *CL-1:IL01* **Research and Perspectives of Transparent Optical Ceramics**
YIQUAN WU, K. INAMORI, School of Engineering, New York State College of Ceramics at Alfred University, Alfred, NY, USA

15.00 *CL-1:IL02* **Light-driven Multiple Charge Transfers in Metal Oxide Nanocrystals**
I. KRIEGEL, Functional Nanosystems, Italian Institute of Technology, Genova, Italy

15.30 *Break*

Chair: Yiquan WU, USA

16.00 *CL-1:L05* **Quantum Dot Structures in Glass Matrices for Solar Photo-thermal Water Heating**
M. AL-MURISH[1], E. BARIMAH[1], V. AUTADE[2], R.P. PANMAND[2], B.B. KALE[2], A. SCOTT[1], B. COAPES[3], A. JHA[1], [1]School of Chemical and Process Engineering, University of Leeds, Leeds, UK; [2]Center for Materials for Electronics Technology (C-MET), Ministry of Electronics and Information Technology (MeitY), Panchawati, Pune, India; [3]Venator Innovation Centre, Wynyard, Stockton-on-Tees, UK

16.20 *CL-1:L07* **Luminescent Si Nanoparticles Assembled in Novel and Facile Mechanochemical Process of (HSiO1.5)n Polymers**
YUPING XU[1], YUNZI XIN[2], TAKASHI SHIRAI[1,2], [1]Department of Life Science and Applied Chemistry, Graduate School of Engineering, Nagoya Institute of Technology, Nagoya, Aichi, Japan; [2]Advanced Ceramics Research Center, Nagoya Institute of Technology, Nagoya, Aichi, Japan

SYMPOSIUM CM

DEVELOPMENT AND APPLICATION OF FUNCTIONAL TRANSPARENT CONDUCTING AND SEMICONDUCTING OXIDES

Room: **MONTEFALCO**

Chair: Julia E. MEDVEDEVA, USA *(Convener)*

14.25 *Welcome*

14.30 *CM-1:IL01* **Structure and Properties of Amorphous Oxide Semi-conductors**
J.E. MEDVEDEVA, Department of Physics, Missouri S&T, Rolla, MO, USA

15.00 *CM-1:IL02* **Reinventing inorganic photochromics**
J. MONTERO, L. ÖSTERLUND, Division of Solid-State Physics, The Ångström Laboratory, Uppsala University, Uppsala, Sweden

15.30 *CM-1:IL03* **The Relationship between the Surface Chemistry and Surface Electronic properties of Functional Transparent Semi-conducting Oxides**
M. ALLEN, A. McNEILL, L. CARROLL, R. MARTINEZ-GAZONI, R. REEVES, A. DOWNARD, MacDiarmid Institute for Advanced Materials and Nanotechnology, University of Canterbury, Christchurch, New Zealand

SYMPOSIUM CN

GEOPOLYMERS, INORGANIC POLYMERS AND SUSTAINABLE MATERIALS

Room: **MONTEFALCO**

Chair: Vilma DUCMAN, Slovenia *(Convener)*

16.15 *Welcome*

16.20 *CN-1:IL01* **Advances in Understanding the Gel Structure of Geopolymers**
B. WALKLEY, **D. GEDDES**, Department of Chemical and Biological Engineering, The University of Sheffield, Sheffield, UK

16.50 *CN-1:IL02* **How to Control the Porosity of Dense Geopolymer?**
S. ROSSIGNOL, IRCER, University of Limoges, Limoges, France

17.20 *CN-1:IL03* **Hybrid Cements: Processing and Structural Characterization**
I. GARCIA-LODEIRO, A. PALOMO, A. FERNÁNDEZ-JIMENEZ, Eduardo Torroja Institute (ietcc-CSIC), Madrid, Spain

17.50 *CN-1:IL04* **Effect of Dispersed Phases on the High-temperature Behavior of Alkali-activated Composites**
M.C. BIGNOZZI, Dept. of Civil, Chemical, Environmental and Materials Engineering, University of Bologna, Bologna, Italy

18.20 *CN-1:IL06* **Utilization of Mine Tailings in Alkali Activated Materials**
M. ILLIKAINEN, **P. PERUMAL**, Fibre and Particle Engineering Research Unit, University of Oulu, Oulu, Finland

SYMPOSIUM CP

REFRACTORY MATERIALS CHALLENGES TO MEET CURRENT AND FUTURE INDUSTRY NEEDS

Room: **SPELLO**

Chairs: Jinichiro NAKANO, USA / Victor C, PANDOLFELLI, Brazil *(Conveners)*

14.25 *Welcome*

14.30 *CP-1:IL01* **Effectiveness and Application of Novel Calcium Magnesium Aluminates in Refractory Bricks and Monolithics**
C. WÖHRMEYER, J. GAO, C. PARR, M. SZEPIZDYN, P. EDWARDS, C. DETEUF, IMERYS, Oberhausen, Germany

15.00 *CP-1:IL02* **Synthesis of Aluminum Silicon Carbide and its Application**
HATSUO TAIRA, T. MAEDA, S. UCHIDA, Okayama Ceramics Research Foundation, Bizen, Okayama, Japan

15.30 *Break*

Chair: Hatsuo TAIRA, Japan

16.00 *CP-2:IL01* **ATHORNA: An Innovative Device for Monitoring Thermal Shock Behaviour of Refractories Combining Various In-situ Advanced Measurements**
M. HUGER[1], R. KACZMAREK[1], R. OLIVEIRA[2], M. MOUIYA1, 3, J.-C. DUPRÉ[4], P. DOUMALIN[4], N. TESSIER-DOYEN[1], Y. TAMRAOUIA3, O. POP[5], [1]University of Limoges, UMR CNRS 7315 - IRCER, Centre Européen de la Céramique, Limoges, France; [2]University of Coimbra, ISISE Inst., Dept. of Civil Eng., Coimbra, Portugal; [3]University Mohammed VI Polytechnic, MSN Dept, Ben Guerir, Morocco; [4]University of Poitiers, Pprime Inst., UPR CNRS 3346, Futuroscope Chasseneuil, France; [5]University of Limoges, GC2D, Egletons, France

16.30 *CP-2:IL02* **In Situ Raman Analysis of Refractory Materials**
M.R. AMMAR, ICMN-CNRS, UMR 7374 Univ. Orléans, Orléans, France

17.00 *CP-2:L04* **Characterization of Aluminium Titanate based Materials: Thermomechanical Properties related to Microstructure**
M. MOUIYA[1, 2], N. TESSIER-DOYEN[2], Y. TAMRAOUI[1], J. ALAMI[1], M. HUGER[2], [1]Materials Science, Energy and Nanoengineering Dept., University Mohammed VI Polytechnic (UM6P), Ben Guerir, Morocco; [2]University of Limoges, Inst. of Research for Ceramics (IRCER), UMR 7315, European Ceramics Center, Limoges Cedex, France

CQ - 9th International Conference

ADVANCED INORGANIC FIBRE COMPOSITES FOR STRUCTURAL AND THERMAL MANAGEMENT APPLICATIONS

Room: **NORCIA**

Chair: Mrityunjay SINGH, USA *(Convener)*

14.25 *Welcome*

14.30 *CQ-1:IL01* **Development of Oxide Ceramic Fibers for OCMCs**
B. CLAUSS, S. PFEIFER, H.-J. BAUDER, S. KRÖNER, H. STOLPMANN, C. GRELLER, A. RENFFTLEN, L. REINDERS, M. CALISKAN, M.R. BUCHMEISER, German Institutes of Textile and Fiber Research DITF, Denkendorf, Germany

15.00 *CQ-1:IL02* **Which is the Best SiC Precursor for Chemical Vapor Infiltration and High Temperature Applications?**
A. DESENFANT[1], G. LADUYE[2], S. GOUJARD[3], G. VIGNOLES[1], **G. CHOLLON**[1], [1]Laboratoire des Composites Thermostructuraux, CNRS, Pessac, France; [2]Air Liquide, France; [3]Safran Ceramics, France

15.30 *CQ-1:L04* **Upscaling of Spinning Processes for Endless Multifilament Ceramic Fibers**
A. RÜDINGER, **R. HERBORN**, H. SCHOLZ, P. VIERHAUS, J. VETTER; Fraunhofer ISC, Center for High Temperature Materials and Design HTL, Bayreuth, Würzburg, Germany

15.50 *Break*

Chair: Georges CHOLLON, France

16.20 *CQ-2:IL01* **Oxide Fiber Coatings for Lifetime Extension of SiC/SiC Ceramic-matrix Composites**
M.K. CINIBULK[1], E.E. BOAKYE[1, 2], P. MOGILEVSKY[1, 2], R.S. HAY[1], [1]Air Force Research Laboratory, WPAFB, OH, USA; [2]UES, Inc., Dayton, OH, USA

16.50 *CQ-2:IL02* **Tailoring of CMC Properties by Varying Fiber Matrix Interfaces**
J. MOOSBURGER-WILL, D. KOCH, S. HORN, Institute of Materials Resource Management, University of Augsburg, Augsburg, Germany

CR - 9th International Conference

SCIENCE AND ENGINEERING OF NOVEL SUPERCONDUCTORS

Room: **SALA RELATORI**

Chair: Davor PAVUNA, Switzerland *(Convener)*

14.25 *Welcome*

14.30 *CR-2:IL01* **Nodal Multigap Superconductivity in the Iron-based Compound RbCa2Fe4As4F2**
D. DAGHERO[1], D. TORSELLO[1, 2], E. PIATTI[1], G.A. UMMARINO[1, 3], X. YI[4], X. XING[4], Z. SHI[4], G. GHIGO[1, 2], [1]Department of Applied Science and Technology, Politecnico di Torino, Torino, Italy; [2]Istituto Nazionale di Fisica Nucleare, Sezione di Torino, Torino, Italy; [3]National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Moskva, Russia; [4]School of Physics, Southeast University, Nanjing, China

15.00 *CR-2:IL02* **Murunskite - Interpolation Compound between Cuprates and Pnictides**
D. TOLJ[1], T. IVŠIĆ[1], I. ŽIVKOVIĆ[1], K. SEMENIUK[1], E. MARTINO[1], A. AKRAP[2], P. REDDY[3], B. KLEBEL-KNOBLOCH[4], I. LONČARIĆ[5], L. FORRÓ[1], N. BARIŠIĆ[4,3], H. RONNOW[1], D.K. SUNKO[3], [1]EPFL, Lausanne, Switzerland; [2]University of Fribourg, Switzerland; [3]University of Zagreb, Croatia; [4]TU Wien, Austria; [5]Rudjer Boskovic Institute, Croatia

15.30 *CR-3:IL08* **Ultranodal Pair State in FeSe1-xSx Superconductors**
TAKASADA SHIBAUCHI, Department of Advanced Materials Science, University of Tokyo, Kashiwa, Japan

SYMPOSIUM CA

ADVANCES IN PROCESSING SCIENCE AND MANUFACTURING OF HIGH PERFORMANCE CERAMICS AND COMPOSITES

Room: **ASSISI A**

Chair: Ivar REIMANIS, USA

9.00 *CA-1:L12* **Study of Matrix Growth Mechanisms during the Injection and Filtration Process of Ceramic Suspensions into a Ceramic Matrix Composite Preform (CMC)**
N. EBERLING-FUX, Safran Ceramics, Merignac, France

9.20 *CA-1:L13* **The Influence of Carbon on the Microstructure and Wear Resistance of Alumina**
R. MARDER[1], LI-OR COHEN[1], P. GHOSH[1], I. REIMANIS[2], W.D. KAPLAN[1], [1]Dept of Materials Science and Engineering, Technion, Haifa, Israel; [2]Colorado Center for Advanced Ceramics, Metallurgical and Materials Engineering Dept, Colorado School of Mines, USA

9.40 *CA-1:L14* **Three Sustainable Polypropylene Surface Treatments for the Compatibility Optimization of PP Fibers and Cement Matrix in Fiber Reinforced Concretes**
B. MALCHIODI, P. POZZI, C. SILIGARDI, University of Modena and Reggio Emilia, Dept of Engineering Enzo Ferrari, Modena, Italy

10.00 *CA-2:IL01* **Powder-Less Processing of Nano-structured Ceramics: Possible Fabrication of Various Advanced Ceramics from Solutions and/or Melts**
MASAHIRO YOSHIMURA, Visiting Distinguished Chair Professor: National Cheng Kung University, Tainan,Taiwan; Professor Emeritus, Tokyo Institute of Technology,Tokyo, Japan

10.30 *Break*

Focused Session CA-9

BIO-INSPIRED AND BIO-ENABLED PROCESSING

Chair: Masahiro YOSHIMURA, Taiwan *(Convener)*

10.55 *Welcome*

11.00 *CA-9:IL01* **Ceramic Inverse-Opal Structures for Photonic and Catalytic Applications**
J. AIZENBERG, Harvard University, Cambridge, MA, USA

11.30 *CA-9:IL03* **Bioinspired Ceramics in Architecture**
M. BECHTHOLD, J. GRINHAM, J.-P. UGARTE, Harvard University, Graduate School of Design, Cambridge, MA, USA

12.00 *CA-9:IL04* **Low Temperature Processing of Biomimetic Apatite-based Bioceramics**
C. REY, C. DROUET, S. CAZALBOU, D. GROSSIN, S. SARDA, J. SOULIÉ, G. BERTRAND, **C. COMBES**, CIRIMAT, Université de Toulouse, UPS, CNRS, INP ENSIACET, Toulouse, France

SYMPOSIUM CB

BIG DATA AND MACHINE LEARNING METHODS FOR MATERIALS ADVANCEMENTS

Room: **SALA STAMPA**

Chair: Fadi ABDELJAWAD, USA

8.55 *Welcome*

9.00 *CB-1:KL1* **Network Theory Meets Materials Science**
C. WOLVERTON[1], V. HEGDE[1], M. AYKOL[2], [1]Northwestern University, Department of Materials Science and Eng., Evanston, IL USA; [2]Toyota Research Institute, Los Altos, CA USA

9.40 *CB-1:IL01* **Autonomous Combinatorial Experimentation**
ICHIRO TAKEUCHI, University of Maryland, College Park, MD, USA

10.10 *CB-1:IL04* **Understanding General Grain Boundaries in 8+ Dimensions for Big Data Enhanced Materials Design**
JIAN LUO, University of California San Diego, La Jolla, CA, USA

10.40 *Break*

Chair: Chris WOLVERTON, USA

11.10 *CB-1:IL06* **Active Learning of Bayesian Force Fields for Fast Molecular Dynamics Simulations of Rare Events**
B. KOZINSKY, Harvard University, Cambridge, MA, USA

11.40 *CB-1:IL08* **AiiDA and Materials Cloud: Coupling High-throughput Computational Automation with Data Management for the Creation of Materials Properties Databases**
G. PIZZI, **M. BERCX**, EPFL and NCCR MARVEL, Lausanne, Switzerland

12.10 *CB-1:L09* **Smart Data Analysis for Machining of Ceramic Matrix Composites**
R. GOLLER, P. LEON-PEREZ, University of Applied Sciences, Augsburg, Germany

SYMPOSIUM CD

HIGH AND ULTRA HIGH TEMPERATURE CERAMICS AND COMPOSITES FOR EXTREME ENVIRONMENTS

Room: **MAGIONE B**

Chair: Branko MATOVIC, Serbia

9.00 *CD-1:IL07* **C3HARME: Next Generation Ceramic Composites for Combustion Harsh Environments and Space**
L. ZOLI, P. GALIZIA, L. SILVESTRONI, A. VINCI, S. FAILLA, F. SERVADEI, D. SCITI, CNR-ISTEC, Faenza, Italy

9.30 *CD-1:L08* **Optimization of Processing Conditions for the Fabrication of Bulk High Entropy Borides**
S. BARBAROSSA[1], R. ORRÙ[1], A. IACOMINI[2], S. GARRONI[2], G. CAO[1], [1]Dip. di Ingegneria Meccanica, Chimica e dei Materiali, Università degli Studi di Cagliari, Cagliari, Italy; [2]Dip. di Chimica e Farmacia, Università degli Studi di Sassari, Sassari, Italy

9.50 *CD-1:L09* **Near Net Shape Manufacturing of Complex Components of Thermal Protection System of a Re-entry Vehicle based on Liquid Silicon Infiltration (LSI) process**
M. DE STEFANO FUMO, P. SPENA, F. DE NICOLA, R. GARDI, R. FAUCI, G. RUFOLO. Centro Italiano Ricerche Aerospaziali (CIRA), Italy; **L. CAVALLI**, F. GIACOMETTI, M.Y. AKRAM, M. BOIOCCHI, M. CANTÙ, M. VALLE. Petroceramics S.p.A., Stezzano, Italy

10.10 *CD-1:L10* **Highly Electrically and Thermally Conductive Silicon Carbide - Graphene Composites**
O. HANZEL, Z. LENČÉŠ, Y-W. KIM, J. FEDOR, P. ŠAJGALÍK, Inst.of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava, Slovak Republic; Functional Ceramics Lab., Dept. of Materials Science and Eng., University of Seoul, Seoul, South Korea; Inst. of Electrical Eng., Slovak Academy of Sciences, Bratislava, Slovak Republic

10.30 *Break*

Chair: Laura SILVESTRONI, Italy

11.00 *CD-1:IL11* **Effect of Sintering Technique on Properties of Nanocrystalline Composite B4C/SiC Ceramics**
B. MATOVIC, University of Belgrade, Institute for Nuclear Sciences Vinca, Serbia

11.30 *CD-1:L12* **Titanium Carbide Nanostructured Targets for Nuclear Medicine and Physics Applications**
S. CORRADETTI, A. ANDRIGHETTO, INFN, Legnaro, Italy; S. CARTURAN, G. MAGGIONI, Università di Padova, Dip. di Fisica e Astronomia, Padova, Italy; G. FRANCHIN, P. COLOMBO, Università di Padova, Dip. di Ingegneria Industriale, Padova, Italy

11.50 *CD-1:L13* **Novel Multicomponent Pyrochlore Oxides for Future Thermal Barrier Coatings**
P. HUTTERER, M. LEPPLE, DECHEMA Research Institute, Frankfurt a.M., Germany

12.10 *CD-1:L14* **Flash Spark Plasma Sintering of Pure TiB2 with Dieless Configuration**
S. FAILLA[1], SHUAI FU[2], S. GRASSO[2], D. SCITI[1], [1]ISTEC-CNR, Faenza, Italy; [2]Key Lab. of Advanced Tech. of Mats, Ministry of Education, School of Mats Science and Eng., Southwest Jiaotong University, Chengdu, China

SYMPOSIUM CE

PROGRESS IN NANO-LAMINATED TERNARY CARBIDES, NITRIDES AND BORIDES (MAX/MAB) PHASES AND DERIVATIVES THEREOF (MXENES)

Room: **ASSISI B**

Chair: Johanna ROSEN, Sweden

9.00 *CE-2:IL01* **Quat Derived Nanomaterials or QDNs**
M.W. BARSOUM, Department of Materials Science and Engineering, Drexel University, Philadelphia, PA, USA

9.30 *CE-2:IL02* **Synthesis of MAX Phases with Unique Shapes and Morphologies**
C.S. BIRKEL, J.P. SIEBERT, Arizona State University, Tempe, AZ, USA; N. KUBITZA, Technische Universität Darmstadt, Darmstadt, Germany

10.00 *CE-2:L04* **Near Ambient Conditions, Bottom-up Synthesis of Metal Oxides 2D flakes, their Properties, and Potential Applications**
H. BADR, M. BARSOUM, Department of Material Science and Engineering, Drexel University, Philadelphia, PA, USA

10.20 *CE-2:L05* **Pulsed Laser Deposition as a New Tool for the Epitaxial Growth of MAX Phase Thin Films**
H. PAZNIAK[1], M. STEVENS[1], A. JEMIOLA[1], M. FELEK[1], M. FARLE[1,2], **U. WIEDWALD**[1], [1]Faculty of Physics and Center for Nanointegration Duisburg-Essen, University of Duisburg-Essen, Germany; [2]Kirensky Institute of Physics, Federal Research Center KSC SB RAS, Krasnoyarsk, Russia

10.40 *Break*

Chair: Christina BIRKEL, USA

11.10 *CE-2:L07* **Synthesis in Hydride Cycle of Ti-Al-C based MAX-Phases from mixtures of Titanium Carbohydrides and Aluminum powders**
G.N. MURADYAN[1], S.K. DOLUKHANYAN, A.G. ALEKSANYAN, O.P. TER-GALSTYAN, N.L. MNATSAKANYAN, K.V. ASATRYAN, S.S.MARDANYAN, A.B. Nalbandyan Institute of Chemical Physics of Armenian National Academy of Sciences (IChPhNAS RA), Yerevan, Armenia

11.30 *CE-2:L08* **Extrusion-based AM of MAX Phases Ti3SiC2 and Cr2AlC Feedstocks**
E. TABARES[1], A. JIMENEZ-MORALES[1], M. KITZMANTEL[2], E. NEUBAUER[2], **S.A. TSIPAS**[1], [1]Departamento de Ciencia e Ingenieria de Materiales e Ingenieria Quimica, IAAB, Universidad Carlos III de Madrid, Leganes, Spain; [2]RHP-Technology GmbH, Forschungs- und Technologiezentrum, Seibersdorf, Austria

11.50 *CE-2:L09* **Optimized Spark Plasma Sintering of Bulk (Cr1-xMnx)2AlC MAX-phase**
K. SOBOLEV, M. GORSCHENKOV, M. DOROKHIN, V. RODIONOVA, Immanuel Kant Baltic Federal University, Kaliningrad, Russia; National University of Science and Technology MISiS, Moscow, Russia; Lobachevsky Nizhny Novgorod State University, Nizhny Novgorod, Russia

SYMPOSIUM CF

ADVANCES IN FUNCTIONAL MATERIALS FOR ENERGY HARVESTING, STORAGE AND SOLAR FUELS

Room: **SPOLETO A**

Chair: Jan MACAK, Czech Republic

9.00 *CF-1:L10* **Carbon Nanotube Coating from Electrophoretic Deposition Designed for Photo thermal Solar Receptors**
F. DIDIER, X. DESCHANELS, G. TOQUER, ICSM, Univ Montpellier, CEA, CNRS, ENSCM, Marcoule, France

9.20 *CF-1:L11* **Molten Salt Flux Synthesis of Defective CaSnO3 with Tailoring Morphology and Enhanced Photocatalytic Activity**
JINGWEN WANG, TAKUYA HASEGAWA, SHU YIN, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai, Japan; YUSUKE ASAKURA, Kagami Memorial Research Institute for Materials Science and Technology, Waseda University, Tokyo, Japan

9.40 *CF-1:L12* **Novel MOCVD Deposition Strategies to Obtain Thin Films with Improved Functional Properties**
M. BURRIEL[1], R. RODRIGUEZ-LAMAS[1], A. STANGL[1], A. RIAZ[1, 3], C. PIROVANO[2], L. RAPENNE[1], E. SARIGIANNIDOU[1], D. PLA[1], O. CHAIX-PLUCHERY[1], M. MERMOUX[3], R.-N. VANNIER[2], C. JIMÉNEZ[1], [1]Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; [2]Univ. Lille, CNRS, Centrale Lille, ENSCL, Univ. Artois, UMR 8181 - UCCS - Unité de Catalyse et Chimie du Solide, Lille, France; [3]Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble INP, LEPMI, Grenoble, France

10.00 *Break*

Chair: Valerie DEMANGE, France

10.30 *CF-1:IL14* **Advanced Fluoride Films for Energy Conversion**
A.L. PELLEGRINO[1], A. SPEGHINI[2], **G. MALANDRINO**[1], [1]Dipartimento di Scienze Chimiche, Università di Catania and INSTM UdR Catania, Catania, Italy; [2]Nanomaterials Research Group, Dipartimento di Biotecnologie, Università di Verona and INSTM, UdR Verona, Verona, Italy

11.00 *CF-1:IL15* **2D Molybdenum Dichalcogenides Prepared by Atomic Layer Deposition**
R. ZAZPE[1, 2], J. CHARVOT[3], L. HROMADKO[1, 2], H. SOPHA[1, 2], F. BUREŠ[3], **J.M. MACAK**[2], [1]Center of Materials and Nanotechnologies, Faculty of Chemical Technology, University of Pardubice, Pardubice, Czech Republic; [2]Central European Institute of Technology, Brno University of Technology, Brno, Czech Republic; [3]Institute of Organic Chemistry and Technology, Faculty of Chemical Technology,University of Pardubice, Pardubice, Czech Republic

11.30 *CF-1:IL16* **Lithium Niobate Thin Films for Vibrational Harvesting**
S.MARGUERON, G. CLEMENTI, M. OUHABAZ, M. COSTANZA, B. DULMET, A. BARTASYTE, UBFC UFC ENSMM CNRS, Institut FEMTO-ST, Besançon, France

SYMPOSIUM CG

CERAMIC THIN FILMS AND COATINGS FOR PROTECTIVE, TRIBOLOGICAL AND MULTIFUNCTIONAL APPLICATIONS

Room: **SPOLETO B**

Chair: Andrey A. VOEVODIN, USA

9.00 *CG-2:IL01* **Self-Lubricating PVD Coatings for Components and Tools**
K. BOBZIN, **C. KALSCHEUER**, Surface Engineering Institute (IOT), RWTH Aachen University, Aachen, Germany

9.30 *CG-2:L02* **Direct Liquid Injection Chemical Vapor Deposited Zirconium Oxide-based Corrosion Barriers on Low-alloy Steels**
A. JAUD, D. SAMÉLOR, D. SADOWSKI, C. VAHLAS, CIRIMAT-CNRS, Université de Toulouse, Toulouse Cedex, France; S. PONTON, H. VERGNES, B. CAUSSAT, LGC-CNRS, Université de Toulouse, Toulouse Cedex, France; A. ABDEL AAL, J. ETZKORN, Chemistry and Materials Engineering, Fachhochschule Dortmund, Dortmund, Germany

9.50 *CG-2:IL08* **Structure Effects on the Aging, Surface Chemistry and Friction Performance of Composite MoS2 Thin Films**
M.T. DUGGER, J.F. CURRY, N.S. BOBBITT, M.E. CHANDROSS, Materials, Physical and Chemical Sciences Center, Sandia National Laboratories, Albuquerque, NM, USA

10.20 *CG-2:IL09* **Characterisation of Plasma and Surface Modification of Multi-element Arc Cathodes for Coating Deposition**
R. FRANZ, Department of Materials Science, Montanuniversität Leoben, Leoben, Austria

10.50 *Break*

Chair: Robert FRANZ, Austria

11.20 *CG-2:IL10* **Duplex PEO/TMD Composite Coatings for Aluminum Alloys**
A. VOEVODIN[1], A. SHIRANI[1], D. BERMAN[1], A. YEROKHIN[2], A. KORENYI-BOTH[3], T.W. LISKIEWICZ[4], S.M. AOUADI[1], J.-E. MOGONYE[5], S. BERKEBILE[5], [1]University of North Texas, Denton, TX, USA; [2]University of Manchester, Manchester, UK; [3]Colorado School of Mines, Golden, CO, USA; [4]Manchester Metropolitan University, Manchester, UK; [5]U.S. DEVCOM Army Research Laboratory, Aberdeen Proving Ground, MD, USA

11.50 *CG-2:IL12* **Ceramic Thin Films for MEMS and Sensors Applications**
J. PATSCHEIDER, C.V. FALUB, M. TSCHIRKY, B. HEINZ, A. MAZZALAI, H. ROHRMANN, Evatec AG, Trübbach, Switzerland

12.20 *CG-2:IL13* **Multifunctional Nitride and Oxide Thin Film for Thermo-electrics and Energy Harvesting**
A. LE FEBVRIER, P. EKLUND, Energy Materials Unit, Thin Film Physics Division, Dept. of Physics, Chemistry and Biology (IFM), Linköping University, Linköping, Sweden

SYMPOSIUM CI

PROGRESS IN ELECTROCERAMICS RESEARCH

Room: **MAGIONE A**

Chair: Byeong-Jun PARK, South Korea

9.00 *CI-2:IL04* **Strain Effect on Relaxor Ferroelectric Domains in Epitaxial 0.67Pb(Mg1/3Nb2/3)O3-0.33PbTiO3/SrRuO3 Heterostructures**
M. SPREITZER[1], J. BELHADI[1], U. GABOR[1], H. URŠIČ[2], N. DANEU[1], G. KOSTER[1, 3], [1]Advanced Materials Dept, Jožef Stefan Institute, Ljubljana, Slovenia; [2]Electronic Ceramics Dept, Jožef Stefan Institute, Ljubljana, Slovenia; [3]MESA+ Institute for Nanotechnology, University of Twente, Enschede, The Netherlands

9.30 *CI-2:IL10* **Local Structural Features and their Dynamics in Lead-Free Ferroelectrics at Atomic Scale**
A. BENCAN[1,4], O. CONDURACHE[1,4], H. URSIC[1,4], T. ROJAC[1,4], M. KOMELJ[3], B. DKHIL[5], A BRADESKO[5], D. DAMJANOVIC[6], G. DRAZIC[2], [1]Electronic Ceramics Dept, Jozef Stefan Institute, Ljubljana, Slovenia; [2]Dept of Mats Chemistry, National Institute of Chemistry, Ljubljana, Slovenia; [3]Dept for Nanostructured Mats, Jozef Stefan Institute, Ljubljana, Slovenia; [4]Jozef Stefan International Postgraduate School, Ljubljana, Slovenia; [5]Lab. Structures, Propriétés et Modélisation des Solides, CentraleSupélec, Université Paris-Saclay, Gif-sur-Yvette, France; [6]Group for Ferroelectrics and Functional Oxides, Institute of Materials, EPFL, Lausanne, Switzerland

10.00 *CI-2:L13* **Electrocaloric Effect of KTa0.65Nb0.35O3 / BaTiO3 Multilayer Thin Films prepared by sol-gel Method**
BYEONG-JUN PARK, Dept. of Materials Engineering and Convergence Technology, RIGET, Gyeongsang National University, Jinju, South Korea

10.20 *Break*

Continued on next page

Continued from preceding page

Chair: Andreja BENCAN, Slovenia

10.50 *CI-2:IL17* **Sintering Strategies towards Piezoceramics and MEMS with Controlled Chemistry and Interfaces**
C. ELISSALDE, U.C. CHUNG, I.M. RUA TABORDA, M. MAGLIONE, CNRS, Université de Bordeaux, ICMCB, Pessac, France; H. DEBÉDA, A. DIOP, B. PLANO, Université de Bordeaux, Laboratoire IMS, Talence, France

11.20 *CI-2:L22* **Dynamics of Ferroelectric Domain Walls in Bismuth Ferrite Observed by In-situ Voltage Biasing Transmission Electron Microscopy**
O. CONDURACHE[1,2], G. DRAŽIĆ[1,2,3], T. ROJAC[1,2], H. URŠIČ[1,2], B. DKHIL[4], A. BRADEŠKO[4], A. BENČAN[1,2], [1]Electronic Ceramics Dept, Jožef Stefan Institute, Ljubljana, Slovenia; [2]Jožef Stefan International Postgraduate School, Ljubljana, Slovenia; [3]Dept of Materials Chemistry, National Institute of Chemistry, Ljubljana, Slovenia; [4]Lab. Structures, Propriétés et Modélisation des Solides, CentraleSupélec, Université Paris-Saclay, Gif-sur-Yvette, France

11.40 *CI-3:IL02* **Magnetization Reversal by Electric Field at Room Temperature in Co Substituted Bismuth Ferrite Thin Film**
MASAKI AZUMA, K. SHIGEMATSU, Laboratory for Materials and Structures, Tokyo Institute of Technology, Yokoyama, Japan and Kanagawa Institute of Industrial Science and Technology, Ebina, Japan; K. SHIMIZU, K. OZAWA, M. KATSUMATA, Lab. for Materials and Structures, Tokyo Institute of Technology, Yokoyama, Japan; H. HOJO, Dept of Energy and Material Science, Kyushu University, Fukuoka, Japan; K. MIBU, Nagoya Institute of Technology, Nagoya, Japan

SYMPOSIUM CJ

MATERIALS DEMANDS TOWARDS NEXT GENERATION ELECTROCHEMICAL ENERGY STORAGE SYSTEMS

Room: **ORVIETO**

Chair: Steve G. GREENBAUM, USA *(Convener)*

9.55 *Welcome*

10.00 *CJ-1:IL02* **Sustainability Implications of Emerging Batteries – Prospective LCA of Sodium and Magnesium Batteries**
M. WEIL, J. PETERS, C. TOMASINI MONTENEGRO, M. BAUMANN, KIT-HIU, KIT-ITAS, Karlsruhe, Germany

10.30 *CJ-1:IL03* **Operando Interface Characterization of Battery Materials**
E.J. BERG, Department of Chemistry, Uppsala University, Sweden

11.00 *Break*

Chair: Eric J. BERG, Sweden

11.30 *CJ-1:IL05* **On the Road to a Multi-coaxial-cable Battery: Development of a Novel 3D-printed Composite Solid Electrolyte**
D. GOLODNITSKY[1,2], H. RAGONES[1], A. VINEGRAD[1], G. ARDEL[1], E. MADOS[1], Y. KAMIR[1], M. GOOR[1], M.M. DORFMAN[1], A. GLADKIKH[2], [1]School of Chemistry, Tel Aviv University, Tel Aviv, Israel; [2]Wolfson Applied Materials Research Center, Tel Aviv, Israel

12.00 *CJ-1:IL06* **Synthesis of Micron-sized Ni-Rich Li(Ni,Co,Mn) O2 and Assessment of Bimodal Distributed Li-ion Battery Cathodes**
NAE-LIH WU, CHIA-HSIN LIN, WEI-HSIANG CHEN, Department of Chemical Engineering, National Taiwan University, Taipei, Taiwan

SYMPOSIUM CL

INORGANIC MATERIALS SYSTEMS FOR ADVANCED PHOTONICS

Room: **CORCIANO**

Chair: Ilka KRIEGEL, Italy

10.30 *CL-2:IL02* **Graphene-based Structures and Composites for Biophotonics**
A. LUKOWIAK, Y. GERASYMCHUK, K. HALUBEK-GLUCHOWSKA, M. FANDZLOCH, D. SZYMANSKI, P. GLUCHOWSKI, Institute of Low Temperature and Structure Research, PAS, Wroclaw, Poland; L.T.N. TRAN, M. FERRARI, IFN-CNR CSMFO Lab. and FBK Photonics Unit, Trento, Italy

11.00 *CL-2:IL05* **Impact of the Sintering Pressure on the Thermoluminescence Properties of Persistent Luminescent Ceramics**
P. GŁUCHOWSKI[1, 2], R. TOMALA[1], S. VELTRI[1], K. RAJFUR[3], D. KUJAWA[1], V. BOIKO[1], W. STREK[1], [1]Institute of Low Temperature and Structure Research, Polish Academy of Sciences, Wroclaw, Poland; [2]Nanoceramics Inc., Wroclaw, Poland; [3]Wroclaw University of Science and Technology, Wroclaw, Poland

11.30 *CL-2:L07* **Enhancing Photoluminescence of Ceramic Phosphors Fabricated by Spark Plasma Sintering**
B. RATZKER[1], A. WAGNER[2], S. KALABUKHOV[2], M. SOKOL[1], N. FRAGE[2], [1]Department of Materials Science and Engineering, Tel Aviv University, Tel Aviv, Israel; [2]Department of Materials Engineering, Ben-Gurion University of the Negev, Beer-Sheva, Israel

11.50 *CL-3:IL05* **Mid-infrared Supercontinuum Generation from Low-phonon Energy Optical Fibers**
F. SMEKTALA, R. BIZOT, A. LEMIÈRE, A. MALDONADO, M. EVRARD, F. DÉSÉVÉDAVY, B. KIBLER, ICB Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 6303 CNRS-UBFC, Dijon, France

SYMPOSIUM CN

GEOPOLYMERS, INORGANIC POLYMERS AND SUSTAINABLE MATERIALS

Room: **MONTEFALCO**

Chair: Sylvie ROSSIGNOL, France

9.00 *CN-1:IL07* **Cordierite and SiAlON Foams from the Thermal Treatment of Geopolymer-like Hardened Suspensions**
A. RINCON[1], H. ELSAYED[1], F. DOGRUL[2], P. RABELO MONICH[1,2], **E. BERNARDO**[1], [1]University of Padova, Dept. of Industrial Engineering, Padova, Italy; [2]University of Trencin, FunGlass (Centre for Functional and Surface Functionalized Glass), Slovakia

9.30 *CN-1:IL08* **A Different Approach for a Sustainable Binder: the Extraordinary Leuven Cement**
Y. PONTIKES, KU Leuven, Dept of Materials Eng., Leuven, Belgium

10.00 *CN-1:IL10* **Mesoporous Geopolymers for Fire Resistant Insulating Panels**
C. LEONELLI[1], E. KAMSEU[1, 2], [1]Dip. di Ingegneria "Enzo Ferrari", Università degli Studi di Modena e Reggio Emilia, Modena, Italy; [2]Lab. of Materials, MINRESI/MIPROMALO, Yaoundé, Cameroon

10.30 *CN-1:IL11* **Effect of the Chemical Admixtures on the Geopolymer Properties based on Glass Powder**
T.M. TOGNONVI, A. BALAGUER PASCUAL, A. TAGNIT-HAMOU, K.P. KOBA, Dept of Maths Physics Chemistry, University of Peleforo Gon Coulibaly, Korhogo, Cote d'Ivoire; Dept of Civil Eng., University of Sherbrooke, Sherbrooke Quebec, Canada; Dept of Applied Geology, University of Jean Lorougnon Guede, Daloa, Cote d'Ivoire

11.00 *CN-1:L12* **Large Scale Additive Manufacturing of Inorganic Geopolymer Components Using Binder Jetting**
H. ELSAYED[1, 2], F. GOBBIN[1, 3], M. PICICCO[1, 4], A. ITALIANO[3], P. COLOMBO[1,5], [1]Dept of Industrial Eng., University of Padova, Padova, Italy; [2]Refractories, Ceramics and Building Materials Dept, National Research Centre, Cairo, Egypt; [3]Desamanera Srl, Rovigo, Italy; [4]Centro de Tecnología de Recursos Minerales y Cerámica (CETMIC), Gonnet (La Plata), Argentina; [5]Dept of Materials Science and Eng., Pennsylvania State University, University Park, PA, USA

11.20 *Break*

Chair: Enrico BERNARDO, Italy

11.40 *CN-2:L04* **Geopolymer Materials developed in a Configuration Suitable for Photovoltaic Application**
A. BAFTI, F. BRLEKOVIĆ, V. MANDIĆ, I. PANŽIĆ, Faculty of Chemical Engineering and Technology, Zagreb, Croatia; L. PAVIĆ, Ruđer Bošković Institute, Zagreb, Croatia; G. MALI, National Institute of Chemistry, Ljubljana, Slovenia

12.00 *CN-2:L05* **Alkali Activation of Ceramic Waste for Thermal Insulation Application**
G. MASI, M.C. BIGNOZZI, Dept of Civil, Chemical, Environmental and Materials Eng., University of Bologna, Bologna, Italy

12.20 *CN-2:IL06* **Chemical and Environmental Assessment of Alkali Activated Materials based on Different Precursors**
I. LANCELLOTTI, University of Modena and Reggio Emilia, Dept. of Engineering Enzo Ferrari, Modena, Italy

12.50 *CN-2:L08* **Chemical and Antibacterial Properties of Al2O3-corundum Powders in MK-geopolymer Matrix**
G. DAL POGGETTO[1], L. BARBIERI[1], M. CATAURO[2], C. LEONELLI[1], [1]Dept of Eng. "Enzo Ferrari", University of Modena and Reggio Emilia, Modena, Italy; [2]Dept of Industrial Eng., University of Campania "Luigi Vanvitelli", Aversa, Italy

SYMPOSIUM CP

REFRACTORY MATERIALS CHALLENGES TO MEET CURRENT AND FUTURE INDUSTRY NEEDS

Room: **SPELLO**

Chair: Emmanuel DE BILBAO, France

9.30 *CP-3:IL01* **Refractory Wear and Freeze Lining Formation in Platinum Group Metal Smelters**
A. GARBERS-CRAIG, Centre for Pyrometallurgy, Department of Materials Science & Metallurgical Engineering, University of Pretoria, Pretoria, South Africa

10.00 *CP-3:IL02* **Multi-component Refractory Systems Reinforced for Engineering Resilience**
D.G. GOSKI, M.J. LAMBERT, Allied Mineral Products, Inc., Columbus, OH, USA

10.30 *Break*

Chair: Dana GOSKI, USA

11.00 *CP-4:IL01* **New Approach and Numerical Method to Compute Reactive Mass Transport in Porous Media Coupled with Thermomechanical Effects**
T. SAYET[1], C.-B. TRANG[1], A. BATAKIS[2], E. DE BILBAO[3], E. BLOND[1], [1]Univ. Orléans, Univ. Tours, INSA CVL, Laboratory of mechanics Gabriel Lamé, EA7494, Orléans, France; [2]Univ. Orléans, Institut Denis Poisson, UMR CNRS 7013, Orléans, France; [3]Univ. Orléans, CEMHTI, UPR CNRS 3079, Orléans, France

11.30 *CP-4:IL03* **Modelling and Simulation of Alumina Dissolution by Slag with Aluminates Formation**
E. DE BILBAO, CEMHTI, CNRS UPR3079 - Univ. Orléans, Orléans, France

12.00 *CP-4:L04* **Periodic Thermomechanical Modelling by the Discrete Element Method of Microstructural Aspects within Model Refractory Materials**
Q. PLEDEL[1], M. HUGER[1], D. ANDRE[1], P. DOUMALIN[2], [1]University of Limoges, Institute of Research for Ceramics (IRCER), UMR 7315, European Ceramics Center, Limoges Cedex, France; [2]University of Poitier, Institute Pprime UPR 3346, CNRS, ENSMA, Futuroscope Chasseneuil Cedex, France

CQ - 9th International Conference

ADVANCED INORGANIC FIBRE COMPOSITES FOR STRUCTURAL AND THERMAL MANAGEMENT APPLICATIONS

Room: **NORCIA**

Chair: Jon BINNER, UK

10.00 *CQ-2:IL03* **Integration of Silicon-based Materials to Metals for Thermostructural and Thermal Management Applications**
R. ASTHANA[1], M. SINGH[2], J. MARTINEZ FERNANDEZ[3], F.M. VALERA[3], [1]University of Wisconsin-Stout, Menomonie, WI, USA; [2]Ohio Aerospace Institute, Cleveland, OH, USA; [3]Depto Física de la Materia Condensada-ICMSE, Universidad de Sevilla, Spain

10.30 *CQ-2:L04* **Evaluation of Fiber Interphase Coatings by Tensile Testing of Fiber Bundles and Minicomposites**
J. MAIER, A. NÖTH, Fraunhofer ISC/Center for High Temperature Materials and Design HTL, Würzburg, Germany

10.50 *Break*

Chair: Rajiv ASTHANA, USA

11.20 *CQ-3:IL01* **A New Route to Processing CMCs with Controlled and Variable Matrix Composition**
J. BINNER, B. BAKER, V. RUBIO*, University of Birmingham, Birminghan, UK; *Now with the National Composite Centre, Bristol, UK

11.50 *CQ-3:IL03* **Scaling up of MW-CVI Technology for the Production of CVI SiC-based Ceramic Matrix Composites**
R. D'AMBROSIO, L. ALIOTTA, V. GIGANTE, **A. LAZZERI**, University of Pisa, Dipartimento di Ingegneria Chimica e Industriale, Pisa, Italy

12.20 *CQ-3:IL04* **Insights in the Infiltration of Molten Silicon in Porous Preforms**
J. ROGER, Univ. Bordeaux, CNRS, CEA, Safran Ceramics, LCTS, UMR 5801, Pessac, France

CR - 9th International Conference

SCIENCE AND ENGINEERING OF NOVEL SUPERCONDUCTORSS

Room: **SALA RELATORI**

Chair: Wojciech TABIS, Poland

9.30 *CR-3:IL02* **Ultrasound Evidence for a Two-component Superconducting Order Parameter in Sr2RuO4**
S. BENHABIB, C. LUPIEN, I. PAUL, L. BERGES, M. DION, M. NARDONE, A. ZITOUNI, Z. Q. MAO, Y. MAENO, A. GEORGES, L. TAILLEFER, C. PROUST, LUMES- EPFL, Lausanne, Switzerland

10.00 *CR-3:IL03* **Tuning Quantum Phases in Transition Metal Dichalcogenides via Ionic Liquid Gating-induced Protonation**
E. PIATTI, J. MONTAGNA BOZZONE, D. DAGHERO, R.S. GONNELLI, Department of Applied Science and Technology, Politecnico di Torino, Torino, Italy; G. LAMURA, M. MEINERO, Dipartimento di Fisica, Università di Genova, Genova, Italy; S. RODDARO, Istituto Nanoscienze-CNR, NEST and Scuola Normale Superiore, Pisa, Italy; D. DE FAZIO, ICFO-The Institute of Photonic Sciences, Castelldefels, Spain; G. PROFETA, Department of Physical and Chemical Sciences, University of L'Aquila, L'Aquila, Italy; G. PRANDO, P. CARRETTA, Dipartimento di Fisica, Università di Pavia, Pavia, Italy

10.30 *CR-3:IL05* **Proximity Induced Superconductivity in Monolayer MoS2**
M. IAVARONE[1], D.J. TRAINER[1], B. WANG[2], F. BOBBA[1, 3], N. SAMUELSON[4], X. XI[1], J. ZASADZINNSKI[4], J. NIEMINEN[5], A. BANSIL[2], [1]Physics Department, Temple University, Philadelphia, PA, USA; [2]Physics Department, Northeastern University, Boston, MA, USA; [3]Physics Department, University of Salerno, Fisciano (SA), Italy; [4]Physics Department, Illinois Institute of Technology, Chicago, IL, USA; [5]Computational Physics Laboratory, Tampere University, Tampere, Finland

11.00 *Break*

Chair: Erik PIATTI, Italy

11.30 *CR-3:IL06* **Charge Correlations and Charge Fluctuations in Cuprate Superconductors**
W. TABIS, AGH University of Science and Technology in Krakow, Poland & Vienna University of Technology, Austria

12.00 *CR-3:IL10* **High-Tc Cuprates - Story of Two Electronic Subsystems**
N. BARIŠIĆ[1, 2], [1]Institute of Solid State Physics, TU Wien, Wien, Austria; [2]Department of Physics, Faculty of Science, University of Zagreb, Zagreb, Croatia

Focused Session CA-9

BIO-INSPIRED AND BIO-ENABLED PROCESSING

Room: **ASSISI A**

Chair: Joanna AIZENBERG, USA

14.30 *CA-9:IL06* **Multishell Calcium Phosphate Nanoparticles for Gene and Drug Delivery, Immunostimulation and Imaging**
M. EPPLE, University of Duisburg-Essen, Essen, Germany

15.00 *CA-9:IL08* **Biomimetic Spider Silk Fibres: From Vision to Reality**
T. SCHEIBEL, Department of Biomaterials, Faculty of Engineering Science, University of Bayreuth, Bayreuth, Germany

15.30 *CA-9:L09* **Biohybrids From Microalgae: A New Generation Material**
D. VONA[1], R. RAGNI[1], S.R. CICCO[2], C.V. GARCIA[1], G.M. FARINOLA[1], [1]Dipartimento di chimica, Università degli Studi di Bari "Aldo Moro", Bari, Italy; [2]Istituto per la chimica dei composti organometallici (CNR-ICCOM)-Bari, Italy

15.50 *Break*

SYMPOSIUM CA

ADVANCES IN PROCESSING SCIENCE AND MANUFACTURING OF HIGH PERFORMANCE CERAMICS AND COMPOSITES

Room: **ASSISI A**

Chair: Anne LERICHE, France

16.20 *CA-4:IL01* **Process Control during Microwave Sintering: From Magnetron to Solid-State Radio Frequency Source**
T. GARNAULT[1,2], **S. MARINEL**[2], D. BOUVARD[1], J.-M. CHAIX[1], C. HARNOIS[2], C. MANIÈRE[2], G.L KERBART[2], [1]Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP, Grenoble, France; [2]Laboratoire de Cristallographie et Sciences des Matériaux, Normandie Univ, ENSICAEN, UNICAEN, CNRS, CRISMAT, Caen, France

16.50 *CA-4:IL02* **Microwave Ultra-rapid Sintering of Ceramics**
K.I. RYBAKOV, YU.V. BYKOV, S.V. EGOROV, A.G. EREMEEV, V.V. KHOLOPTSEV, I.V. PLOTNIKOV, A.A. SOROKIN, Institute of Applied Physics, Russian Academy of Sciences, Nizhny Novgorod, Russia

17.20 *CA-4:IL03* **Materials Processing under Non-equilibrium Reaction Field Induced by Microwave Irradiation**
JUN FUKUSHIMA, H. TAKIZAWA, Dept. of Appl. Chem., Tohoku University, Sendai, Miyagi, Japan

17.50 *CA-4:IL04* **Breaking the Stability Threshold of Microwave Sintering: From the Multiphysics Simulation to Advanced Sintering Approaches**
C. MANIERE[1], G. LEE[2,3], S. CHAN[2], E. TORRESANI[2], E.A. OLEVSKY[2,3], S. MARINEL[1], [1]CRISMAT, CNRS, ENSICAEN, UNICAEN, Normandie Univ, France; [2]Powder Technology Laboratory, Department of Mechanical Engineering, San Diego State University, San Diego, CA, USA; [3]Department of NanoEngineering, University of California, San Diego, La Jolla, CA, USA

SYMPOSIUM CC

MODELLING, SIMULATION AND TESTING OF MECHANICAL AND THERMOMECHANICAL PROPERTIES OF BULK CERAMICS, COATINGS AND COMPOSITES

Room: **SALA STAMPA**

Chair: Pavol SAJGALIK, Slovakia *(Convener)*

14.25 *Welcome*

14.30 *CC-3:IL06* **Microstructure Design and Mechanical Properties of Ceramic/Graphene Thick Coatings for New Emerging Applications**
C. BALAZSI, Centre for Energy Research, Budapest, Hungary

15.00 *CC-1:IL01* **High Entropy Transition Metal Carbides – Compositional Space and Mechanical Properties**
Y. WANG[1], R. ZHANG[1], T. CASANDI[2], J. DUSZA[2], **M.J. REECE**[1], [1]Queen Mary University of London, London, UK; [2]Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic

15.30 *CC-1:IL02* **Deformation and Fracture of Advanced Ceramics at Small-Scale during Micro/Nano Mechanical Testing**
J. DUSZA, Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic

16.00 *Break*

Chair: Jan DUSZA, Slovakia

16.30 *CC-1:IL03* **Meso-scale Mechanical Properties of Si3N4 Ceramics Measured using Microcantilever Beam Specimens**
JUNICHI TATAMI, M. UDA, M. IIJIMA, Yokohama National University, Yokohama, Japan; T. TAKAHASHI, T. YAHAGI, Kanagawa Institute of Industrial Science and Technology, Japan

17.00 *CC-1:IL05* **Influence of Structure and Design on Ballistic Performance of Ceramic Armor**
E. MEDVEDOVSKI, Endurance Technologies Inc., Calgary, Canada

17.30 *CC-1:IL08* **Hot-pressed Ultra-high Creep Resistant Silicon Carbide Ceramics**
P. SAJGALIK, Slovak Academy of Sciences, Bratislava, Slovakia

SYMPOSIUM CD

HIGH AND ULTRA HIGH TEMPERATURE CERAMICS AND COMPOSITES FOR EXTREME ENVIRONMENTS

Room: **MAGIONE B**

Chair: Tetiana PRIKHNA, Ukraine

14.30 *CD-2:IL01* **Effects of Coating and Substrate Chemistry on the Steam Oxidation Kinetics of Environmental Barrier Coatings for Ceramic Matrix Composites**
KANG LEE, NASA Glenn Research Center, Cleveland, OH, USA; A. GARG, NASA Glenn Research Center / University of Toledo, Toledo, OH, USA; W.D. JENNINGS, Vantage Partners, Cleveland, OH, USA

15.00 *CD-2:IL02* **High-temperature Oxidation/Corrosion of Silicon Carbide for Nuclear Applications**
M. STEINBRÜCK, Karlsruhe Institute of Technology, Institute for Applied Materials (IAM-AWP), Germany

15.30 *CD-2:IL03* **Corrosion Behavior of RE-doped Silicate for Environmental Barrier Coatings**
BYUNG-KOOG JANG, Interdisciplinary Graduate School of Engineering Science (IGSES), Kyushu University, Fukuoka, Japan

16.00 *Break*

Chair: Willy KUNZ, Germany

16.30 *CD-2:IL05* **Tungsten Carbides and Borides for Shielding of Compact Tokamak Fusion Reactors**
S.A. HUMPHRY-BAKER, Department of Materials, Imperial College London, London, UK

17.00 *CD-2:L06* **Oxidation Behaviour and Thermal Shock Resistance of Ceramic Composites based on Carbides and Borides**
A. KOVALČÍKOVÁ[1], M. IVOR[1], P. TATARKO[2], H. ÜNSAL[2], R. SEDLÁK[1], D. MEDVED[1], A. NAUGHTON-DUSZOVÁ[1,3], E. BACZEK[3], M. PODSIADŁO[3], J. DUSZA[1], [1]Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic; [2]Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava, Slovak Republic; [3]Institute of Advanced Manufacturing Technology, Krakow, Poland

SYMPOSIUM CE

PROGRESS IN NANO-LAMINATED TERNARY CARBIDES, NITRIDES AND BORIDES (MAX/MAB) PHASES AND DERIVATIVES THEREOF (MXENES)

Room: **ASSISI B**

Chair: Martin DAHLQVIST, Sweden

14.30 *CE-3:IL01* **Avoiding the Formation of Carbides in Cr2AlC MAX Phases under Oxidizing Environments**
C. AZINA[1], J. GONZALEZ-JULIAN[2], P. EKLUND[3], J.M. SCHNEIDER[1], [1]Materials Chemistry, RWTH Aachen, Germany; [2]Forschungszentrum Jülich, IEK-1, Germany; [3]Energy Materials Unit, Thin film Physics Division, IFM, Linköping University, Sweden

15.00 *CE-3:IL02* **Breakaway Oxidation of Ti2AlC MAX Phase**
J. GONZALEZ-JULIAN, S. BADIE, O. GUILLON, R. VASSEN, Institute of Energy and Climate Research, Forschungszentrum Jülich, Jülich, Germany

15.30 *CE-3:IL03* **Alumina Forming MAX phases: Current Status and Future Perspectives**
M. RADOVIC, Department of Materials Science & Engineering, Texas A&M University, College Station, TX, USA

16.00 *CE-3:L04* **Elementary Deformation Mechanisms in Single-crystals of MAX Phases Analyzed by Complementary Experimental Approaches**
S. PARENT, C. TROMAS, **A. JOULAIN**, H. BAHSOUN, Pprime Institute, CNRS, University of Poitiers, ISAE-ENSMA, France; G. RENOU, SIMAP, Grenoble, France

16.20 *CE-3:L05* **Intrinsic Deformation and Failure Response of Single Crystal MAX Phases**
ZHIQIANG ZHAN, H. RATHOD, M. RADOVIC, **A. SRIVASTAVA**, Department of Materials Science & Engineering, Texas A&M University, College Station, TX, USA

16.40 *Break*

Chair: Miladin RADOVIC, USA

17.10 *CE-3:IL06* **High-temperature Oxidation of Alumino-forming MAX Phases: Relationship between Powder Metallurgy Processing Routes, Microstructural Characteristics and Oxidation Resistance**
V. GAUTHIER-BRUNET[1], E. DROUELLE[1,2], B. LEVRAUT[1], A. ZUBER[1], J. CORMIER[1], P. VILLECHAISE[1], P. CHARTIER[1], S. DUBOIS[1], P. SALLOT[2], [1]Institut Pprime, CNRS - Université de Poitiers - ENSMA, UPR CNRS 3346, Futuroscope Chasseneuil, France; [2]Safran CRT, Magny-les-Hameaux Cedex, France

17.40 *CE-3:L09* **Cr2AlC Crystal Structure Evolution Prediction during Oxidation**
A. ZUBER[1], G. FRAPPER[2], V. BRUNET[1], S. DUBOIS[1], [1]Institut PPRIME, Chasseneuil du Poitou, France; [2]IC2MP, Poitiers cedex, France

18.0*0* *CE-3:L10* **Analysis of 2D Ti3C2Tz MXene Oxidation and its Influence on Biological Response in Vitro**
A.M. JASTRZEBSKA[1], A. ROZMYSŁOWSKA-WOJCIECHOWSKA, A. SZUPLEWSKA, Warsaw University of Technology, Faculty of Materials Science and Engineering, Warsaw, Poland

SYMPOSIUM CF

ADVANCES IN FUNCTIONAL MATERIALS FOR ENERGY HARVESTING, STORAGE AND SOLAR FUELS

Room: **SPOLETO A**

Chair: Graziella MALANDRINO, Italy

14.30 *CF-1:IL18* **Processable Polymeric Carbon Nitride for Photo-electro-chemical Applications**
I. KRIVTSOV, Institute of Electrochemistry, Ulm University, Germany

15.00 *CF-1:IL19* **Radially-heterostructured III-V Nanowires for Photonics and Photovoltaics**
P. PRETE, IMM-CNR, Lecce, Italy; N. LOVERGINE, Dept. of Engineering for Innovation, University of Salento, Lecce, Italy

15.30 *CF-1:L21* **Photocatalytic Self-cleaning Properties of Developed TiO2 Doped Layered Double Hydroxide in Comparison to the Commercially Available Solutions for Application on Mineral Substrates**
B. MILJEVIC[1], J.M. VAN DER BERGH[2], S. VUČETIĆ[1], J. RANOGAJEC[1], R. CERC KOROŠEC[3], [1]University of Novi Sad, Faculty of Technology, Novi Sad, Serbia; [2]Liverpool John Moores University, Built Environment and Sustainable Technologies (BEST) Research Institute, Liverpool, UK; [3]University of Ljubljana, Faculty of Chemistry and Chemical Technology, Ljubljana, Slovenia

SYMPOSIUM CH

POROUS CERAMICS FOR ENVIRONMENTAL PROTECTION, ENERGY-RELATED TECHNOLOGIES AND ADVANCED INDUSTRIAL CYCLES

Room: **SPOLETO B**

Chair: Paolo COLOMBO, Italy *(Convener)*

14.25 *Welcome*

14.30 *CH-1:IL01* **Increased Porosity and Inner Strut Accessibility in Reticulated Ceramic Foams**
M. SCHEFFLER, Otto-von-Guericke University Magdeburg, Magdeburg, Germany

15.00 *CH-1:IL03* **Colloidal Processing of Reticular Ceramic Foams with Reaction Sintered Secondary Minor Phases**
R. MORENO, C. ALCÁZAR, A. PEREIRA, J.C. FARIÑAS, E. ROSADO, Institute of Ceramics & Glass - CSIC, Madrid, Spain

15.30 *CH-1:IL04* **Direct Ink Writing of Hierarchically Porous Geopolymeric Structures for Environmental Applications**
G. FRANCHIN, R. FUSS BOTTI, K. GOULART DE OLIVEIRA, M. D'AGOSTINI, G. ZANGARINI, P. COLOMBO, Dept. of Industrial Engineering, University of Padova, Padova, Italy

16.00 *Break*

Chair: Rodrigo MORENO, Spain

16.30 *CH-1:IL05* **Surface and Inner Structure Control in Electrospun Ceramic Nanofibers**
G.S. GRADER, G.E. SHTER, O. ELISHAV, Technion – Israel Institute of Technology, Haifa, Israel

17.00 *CH-1:IL07* **Freeze-casting and Additive Manufacturing of Polymer-derived Ceramics**
A. GURLO, Chair of Advanced Ceramic Materials, Technische Universitaet Berlin, German

17.30 *CH-1:IL10* **Additive Manufacturing of Porous Ceramics for Separation Applications**
D. PENNER, ZHAW Zürich University of Applied Sciences; IMPE Institute of Materials and Process Engineering; Laboratory for Ceramic Materials; Winterthur, Switzerland

18.00 *CH-1:IL11* **Sepiolite Based Catalyst Supports Produced by Combined Freeze-robocasting Technique**
J. GURAUSKIS, V. GIL HERNANDEZ, Hydrogen Foundation of Aragon, Huesca, Aragon, Spain; B. SIMONSEN, DTU Energy, Technical University of Denmark, Kgs. Lyngby, Denmark

SYMPOSIUM CK

SOLID OXIDE FUEL CELLS: MATERIALS AND TECHNOLOGY CHALLENGES

Room: **ORVIETO**

Chair: Peter HOLTAPPELS, Denmark

14.30 *CK-2:IL01* **Innovative Architectured Oxygen Electrodes for IT-SOFC using Electrostatic Spray Deposition**
E. DJURADO, N.I. KHAMIDY, R.K. SHARMA, Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble INP, LEPMI, Grenoble, France

15.00 *CK-2:IL02* **Perovskite Oxide Exsolution Anodes for Solid Oxide Fuel Cells**
S.A. BARNETT, T. ZHU, S. ZHANG, Northwestern University, Evanston, IL, USA

15.30 C*K-2:IL04* **Partial Conductivities in Proton-conducting Oxide Systems**
G.C. MATHER, D. PÉREZ COLL, G. HERAS-JUARISTI, Á. TRIVIÑO-PELÁEZ, Instituto de Cerámica y Vidrio, CSIC, Campus de Cantoblanco, Madrid, Spain

16.00 *CK-2:IL05* **Proton Conducting Solid Oxide Cells**
M.E. IVANOVA[1], W. DEIBERT[1], C. LENSER[1], O. GUILLON[1, 2], N.H. MENZLER[1], [1]Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research (IEK-1), Jülich, Germany; [2]JARA Jülich-Aachen Research Alliance – Energy, Germany

16.30 *Break*

Chair: Elisabeth DJURADO, France

17.00 *CK-2:IL08* **Electrocatalysis at Nano-scaled Electrodes in Solid Oxide Fuel Cells**
D.B. DRASBÆK, M.L. TRAULSEN, B.R, SUDIREDDY, **P. HOLTAPPELS**, Technical University of Denmark, Kgs. Lyngby, Denmark

17.30 *CK-2:L09* **Novel In Situ Isotope Exchange Raman Spectroscopy for Improved Understanding of Physiochemical Processes**
A. STANGL[1], D. PLA[1], C. PIROVANO[2], O. CHAIX[1], S. AMBROSIO[1], F. BAIUTTI[3], F. CHIABRERA[3], M. MERMOUX[4], A. TARANCÓN[3], C. JIMENEZ[1], M. BURRIEL[1], [1]Univ. Grenoble Alpes, CNRS, Grenoble-INP, LMGP, Grenoble France; [2]Univ. Lille, CNRS, Centrale Lille, ENSCL, Lille, France; [3]Catalonia Institute for Energy Research (IREC), Barcelona, Spain; [4]Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble INP, LEPMI, Grenoble, France

17.50 *CK-2:L11* **Nano-columnar La2NiO4+δ Films with Multifold Active Surface Area for Enhanced Electrode Performance**
A. RIAZ, A. STANGL, L. RAPENNE, C. JIMÉNEZ, M. BURRIEL, Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; M. MERMOUX, Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble INP, LEPMI, Grenoble, France

SYMPOSIUM CL

INORGANIC MATERIALS SYSTEMS FOR ADVANCED PHOTONICS

Room: **CORCIANO**

Chair: Anna LUKOWIAK, Poland

14.30 *CL-4:IL01* **The Interplay Between Radiation-induced Attenuation, Photodarkening and Photobleaching at Pump Wavelength in Er- and Yb-doped Silica Optical Fibers**
F. MADY, M. BENABDESSELAM, W. BLANC, Université Côte d'Azur, CNRS, INPHYNI UMR 7010, Nice, France

15.00 *CL-4:IL02* **Composite Material Hollow Core Optical Fibres**
P.J.A. SAZIO, A. LEWIS, F. DE LUCIA, F. POLETTI, J.R. HAYES, C.C. HUANG, D. HEWAK, ORC, University of Southampton, UK; J.V. BADDING, Dept. of Chemistry and Materials Research Institute, Pennsylvania State University, State College, PA, USA; W. BELARDI, Université de Lille, CNRS, UMR 8523 - PhLAM - Physique des Lasers Atomes et Molécules, Lille, France

15.30 *CL-4:IL03* **Chalcogenide Glasses for Advanced Photonics**
J.L. ADAM, Glasses & Ceramics Research Group, Institut des Sciences Chimiques de Rennes, UMR CNRS 6226, Université de Rennes 1, France

16.00 *Break*

Chair: Pier-John SAZIO, UK

16.30 *CL-4:IL04* **Novel Hollow Core Optical Fibers: From Design to Applications**
W. BELARDI[1], A. PASTRE[1], S. PLUS[1], K. BAUDELLE[1], G. BOUWMANS[1], L. BIGOT[1], P. JAWORSKI[2], G. DUDZIK[2], P. KOZIOL[2], P.J. SAZIO[3], K. KRZEMPEK[2], [1]Université de Lille, CNRS, UMR 8523 PhLAM, Villeneuve d'Ascq, France; [3]Wroclaw University of Science and Technology, Poland; [3]University of Southampton, UK

17.00 *CL-4:IL05* **Synthesis and Characterization of Novel Magneto Optical Fibers**
M. NALIN, Chemistry Institute, São Paulo State University, Araraquara, SP, Brazil; D.F. FRANCO, Chemistry Institute, São Paulo State University, Araraquara, SP, Brazil

SYMPOSIUM CM

DEVELOPMENT AND APPLICATION OF FUNCTIONAL TRANSPARENT CONDUCTING AND SEMICONDUCTING OXIDES

Room: **MONTEFALCO**

Chair: Martin ALLEN, New Zealand

14.30 *CM-1:IL04* **Doping of monoclinic and corundum (AlxGa1-x)2O3**
D. WICKRAMARATNE, US Naval Research Laboratory, Washington, DC, USA

15.00 *CM-1:IL07* **Role of Native Defects and Electronic Structure in the Performance of Transparent Conductors**
C.G. VAN DE WALLE, Materials Department, University of California, Santa Barbara, CA, USA

15.30 *CM-1:IL09* **Sub-band-gap Absorption in TCOs**
H. PEELAERS, Department of Physics and Astronomy, University of Kansas, Lawrence, KS, USA

16.00 *CM-2:IL02* **Amorphous Oxide Semiconductor Resistive Switching Materials and Devices**
J. DEUERMEIER, M. PEREIRA, E. CARLOS, C. SILVA, R. MARTINS, E. FORTUNATO, A. KIAZADEH, i3N/CENIMAT, Department of Materials Science, NOVA School of Science and Technology and CEMOP/UNINOVA, NOVA University Lisbon, Campus de Caparica, Caparica, Portugal

SYMPOSIUM CP

REFRACTORY MATERIALS CHALLENGES TO MEET CURRENT AND FUTURE INDUSTRY NEEDS

Room: **SPELLO**

Chair: Marc HUGER, France

14.30 *CP-3:IL04* **Corrosion of Refractories by Metallurgical Slags: Keys Issues and Mechanisms – Steel Ladles Applications**
J. POIRIER, CEMHTI-CNRS, University of Orleans, Orleans, France

15.00 *CP-3:IL05* **Self-protecting Mechanism of Magnesia Refractory in Electric Arc Furnace (EAF) Operation Conditions: Challenges of Active Use of Direct Reduced Iron (DRI) as an Alternative iron Source**
JINSUNG HAN, Steelmaking Production Technology Team, Hyundai Steel, Dangjin, South Korea; JUNGHO HEO, Department of Materials Engineering, KU Leuven, Kasteelpark, Leuven, Belgium; **JOOHYUN PARK**, Department of Materials Science and Chemical Engineering, Hanyang University, Ansan, South Korea

15.30 *Break*

Chair: Joohyun PARK, South Korea

16.00 *CP-5:IL02* **DEM Modelling to Investigate the Impact of Microstructure on Refractory**
D. ANDRÉ, T.-T. NGUYEN, F. ASADI, M. HUGER, University of Limoges, IRCER, UMR CNRS 7315, Limoges, France

16.30 *CP-5:IL03* **Contributions to Crack Propagation in Coarse Grained Refractories**
D. GRUBER, H. HARMUTH, Chair of Ceramics, Montanuniversitaet, Leoben, Austria

17.00 *CP-5:IL04* **Towards Corrosion-resistant Refractories**
SHAOWEI ZHANG, University of Exeter, Exeter, UK; JUNFENG CHEN, Wuhan University of Science and Technology, Wuhan, China

CQ - 9th International Conference

ADVANCED INORGANIC FIBRE COMPOSITES FOR STRUCTURAL AND THERMAL MANAGEMENT APPLICATIONS

Room: **NORCIA**

Chair: Jerome ROGER, France

14.30 *CQ-3:IL06* **New Matrices Prepared by Film-boiling Process**
L. MAILLÉ[1], C. BESNARD[1], **A. ALLEMAND**[1, 2], [1]Université de Bordeaux, Laboratoire des Composites ThermoStructuraux UMR 5801, Pessac, France; [2]CEA Le Ripault, Monts, France

15.00 *CQ-3:L09* **The Production of Fire-resistant Fibre Metal Laminate (FML) and Low Cost CMC Components for Transport Applications**
C. MINGAZZINI[1], S. BASSI[2], T. DELISE[1], E. LEONI[1], M. SCAFÈ[1], G. DE ALOYSIO[3], [1]ENEA TEMAF, Faenza, Italy; [2]University of Pisa, Pisa, Italy; [3]CertiMaC, Faenza, Italy

15.20 *CQ-4:L03* **Wet Oxidation Behavior of C/SiC–Si(Hf)(B)CN Composites at High Temperature**
XINGANG LUAN, J. ZHANG, L. WANG, Y. ZOU, L. CHENG, R. RIEDEL, Science and Technology on Thermostructural Composite Materials Laboratory, Northwestern Polytechnical University, Xi'an, Shaanxi, China

15.40 *CQ-4:IL05* **Image-based Modeling of Woven Ceramic Matrix Composites**
G. COUÉGNAT, J. BÉNÉZECH, V. MAZARS, O. CATY, G.L. VIGNOLES, Laboratoire des Composites Thermostructuraux (CNRS/Univ.Bordeaux/Safran/CEA), Pessac, France

CR - 9th International Conference

SCIENCE AND ENGINEERING OF NOVEL SUPERCONDUCTORS

Room: **SALA RELATORI**

Chair: Dario DAGHERO, Italy

14.30 *CR-4:IL01* **Quantum Criticality and Unconventional Superconductivity in Heavy Fermion Systems**
QIMIAO SI, Rice Center for Quantum Materials, Rice University, Houston, TX, USA

15.00 *CR-4:IL02* **Room-temperature Superconductivity in Hydrides**
S. DI CATALDO, University of Rome "La Sapienza", Rome, Italy

15.30 *CR-5:IL01* **Super-oxidized Phases in Cuprate and Iridate Thin Films**
JOHN WEI, Department of Physics, University of Toronto, Canada

16.00 *Break*

Chair: Davor PAVUNA, Switzerland

16.30 *CR-6:IL01* **Energy & Material Efficiency: Liquid Hydrogen & HTS - A Perfect Fit**
T. ARNDT, KIT, ITEP, Eggenstein-Leopoldshafen, Germany

17.00 *CR-6:IL02* **Use of Electromagnetic Potentials for the Modeling of Critical State and AC Losses in Superconducting Wires and Cables**
F. GÖMÖRY, M. SOLOVYOV, Institute of Electrical Engineering, Slovak Academy of Sciences, Bratislava, Slovakia

SYMPOSIUM CA

ADVANCES IN PROCESSING SCIENCE AND MANUFACTURING OF HIGH PERFORMANCE CERAMICS AND COMPOSITES

Room: **ASSISI A**

Chair: Vincenzo M. SGLAVO, Italy

9.00 *CA-3:IL01* **Characteristics of Si-B-C-N-based Ceramics**
R. RIEDEL, Materials Science, TU Darmstadt, Germany

9.30 *CA-3:IL02* **Chemistry and Processability of Preceramic Polymers Towards Advanced Functional Ceramics**
M. BALESTRAT, A. LALE, **S. BERNARD**, Institute of Research on Ceramics-CNRS/University of Limoges, Limoges, France

10.00 *CA-3:IL03* **Evolution of Transient Microporosity in Polymer-derived Ceramics: in-situ Monitoring and Tailoring**
T. KONEGGER, C. DRECHSEL, TU Wien, Institute of Chemical Technologies and Analytics, Wien, Austria; H. PETERLIK, University of Vienna, Vienna, Austria

10.30 *CA-3:L06* **In-Silico Simulations of Polymer Pyrolysis**
P. KROLL, The University of Texas at Arlington, Arlington, TX, USA

10.50 *Break*

Chair: Ralf RIEDEL, Germany

11.10 *CA-3:L07* **Development of a New Binder System for Polymer Derived Mullite Ceramics Made by Fused Deposition Modeling (FDM) Technique**
F. SARRAF[1, 2], F. CLEMENS[1], S.V. CHURAKOV[2], [1]Empa – Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzlerland; [2]University of Bern, Bern, Switzerland

11.30 *CA-3:L08* **Metal-modified Polymer-derived Ceramics for Stereolitho-graphy-based Fabrication of Catalyst Carrier Structures**
J. ESSMEISTER, L. SCHACHTNER, K. FÖTTINGER, G. PACHOLIK, T. KONEGGER, TU Wien, Vienna, Austria

11.50 *CA-6:KL* **Multi Materials Additive Manufacturing**
A. MICHAELIS, Fraunhofer Institute of Ceramic Technologies and Systems, IKTS, Dresden, Germany

12.30 *CA-6:IL01* **3D Printing of Composite Ceramics: Advances and Issues Compared to Traditional Manufacturing**
B. INSERRA, B. COPPOLA, L. MONTANARO, P. PALMERO, **J.M. TULLIANI**, Politecnico di Torino, Department of Applied Science and Technology (DISAT), INSTM R.U. PoliTO, Torino, Italy

Focused Session CA-11

SHS CERAMICS

Room: **MAGIONE A**

Chair: Alexander MUKASYAN, USA *(Convener)*

8.55 *Welcome*

9.00 *CA-11.2:L03* **SHS-derived Powders Obtained by Coupled Reactions and Thermal Dilution for Subsequent Consolidation**
S. AYDINYAN, I. HUSSAINOVA, S. KHARATYAN, A.B. Nalbandyan Institute of Chemical Physics, Yerevan, Armenia and Tallinn University of Technology, Tallinn, Estonia

9.20 *CA-11.2:L04* **Combustion Synthesis of Nanoscale Boron and Silicon Carbides**
M. ZAKARYAN[1], N. AMIRKHANYAN[1], H. KIRAKOSYAN[1], A. ZURNACHYAN[1], S. AYDINYAN[1, 2], [1]A.B. Nalbandyan Institute of Chemical Physics, Yerevan, Armenia; [2]Tallinn University of Technology, Tallinn, Estonia

9.40 *CA-11.2:L05* **Solution Combustion Synthesis and Spark Plasma Sintering of Magnetic High Entropy Materials**
H. KIRAKOSYAN[1], A. SARGSYAN[1], S. AYDINYAN[1,2], S. KHARATYAN[1], [1]A.B. Nalbandyan Institute of Chemical Physics, Yerevan, Armenia; [2]Tallinn University of Technology, Tallinn, Estonia

10.00 *Break*

Chair: Marieta ZAKARYAN, Armenia

10.30 *CA-11.2:IL06* **SHS High-entropy Ceramics**
R. ORRU'[1], S. BARBAROSSA[1], M. MURGIA[1], R. LICHERI[1], S. GARRONI[2], G. CAO[1], [1]Dipartimento di Ingegneria Meccanica, Chimica e dei Materiali, Università degli Studi di Cagliari, Cagliari, Italy; [2]Dipartimento di Chimica e Farmacia, Università degli Studi di Sassari, Sassari, Italy

11.00 *CA-11.2:IL07* **Combustion Synthesis of Metastable Ceramic Phases**
A.S. MUKASYAN, University of Notre Dame, Notre Dame, IN, USA

11.30 *CA-11.3:IL06* **Self-propagating High-temperature Synthesis (SHS) in Joining Technologies**
L.P.H. JEURGENS, B. RHEINGANS, L. DÖRNER, P. SCHMUTZ, J. JANCZAK-RUSCH, Empa, Swiss Federal Laboratories for Materials Science and Technology, Laboratory for Joining Technologies and Corrosion, Dübendorf, Switzerland

SYMPOSIUM CB

BIG DATA AND MACHINE LEARNING METHODS FOR MATERIALS ADVANCEMENTS

Room: **SALA STAMPA**

Chair: Ichiro TAKEUCHI, USA

9.30 *CB-2:KL1* **Monte-Carlo Random Walks for Solving Equations in Large Images. Application to Simulations of CMC Processing and Degradation**
G.L. VIGNOLES, C. CHARLES, C. HEISEL, C. DESCAMPS, University of Bordeaux, CNRS, CEA, Safran : LCTS , Pessac, France

10.10 *CB-2:KL2* **Theoretical and Machine Learning Studies of Grain Boundary Solute Segregation**
F. ABDELJAWAD, Department of Mechanical Engineering, Department of Materials Science and Engineering, Clemson University, Clemson, SC, USA

10.50 *Break*

Chair: Fadi ABDELJAWAD, USA

11.20 *CB-2:IL04* **Accelerating Glass Discovery through Machine Learning and Artificial Intelligence**
N.M. ANOOP KRISHNAN, Department of Civil Engineering, Indian Institute of Technology Delhi, Hauz Khas, New Delhi, India

11.50 *CB-2:IL05* **Data-driven Spectral Analysis for Materials Characterization**
TERUYASU MIZOGUCHI, The University of Tokyo, Tokyo, Japan

12.20 *CB-2:IL09* **Machine Learning Analysis of Multiphase Magnetic Microstructures**
A. KORNELL, A. KOVACS, M. GUSENBAUER, **T. SCHREFL**, Danube University Krems, Wiener Neustadt, Austria

SYMPOSIUM CD

HIGH AND ULTRA HIGH TEMPERATURE CERAMICS AND COMPOSITES FOR EXTREME ENVIRONMENTS

Room: **MAGIONE B**

Chair: Greg HILMAS, USA

9.00 *CD-2:IL08* **C/C/UHTC Composites, towards Reusable Materials**
F. REBILLAT[1], C. LIÉGAUT[1,3], P. BERTRAND[2], **L. MAILLÉ**[1], [1]Université de Bordeaux, CNRS, Safran Ceramics, CEA, Laboratoire des Composites ThermoStructuraux (LCTS), UMR-5801, Pessac, France; [2]Université de Bourgogne Franche Comté, Laboratoire Interdisciplinaire Carnot de Bourgogne (ICB), Site de Sévenans, Sévenans, France; [3]Safran Ceramics, Le Haillan, France

9.30 *CD-2:IL09* **Oxidation of Zirconium and Uranium Carbides**
C. GASPARRINI[1]*, R. PODOR[2], R.J. CHATER[3], D. HORLAIT[4], O. FIQUET[5], S. MAY[6], M.J.D. RUSHTON[7,1], W.E. LEE[1,7], [1]Centre for Nuclear Engineering (CNE) & Department of Materials, Imperial College London, South Kensington Campus, London, UK; [2]Institut de Chimie Séparative de Marcoule, UMR 5257 CEA/CNRS/UM/ENSCM, Site de Marcoule, Bagnols-Sur-Cèze, France; [3]Department of Materials, Imperial College London, South Kensington Campus, London, UK: [4]CNRS, Centre D'Etudes Nucléaires de Bordeaux-Gradignan, UMR 5797, Chemin Du Solarium, Gradignan, France; [5]DEN/DEC/SA3E/LCU Building 315, Atomic Energy Commission (CEA), Saint Paul lez Durance Cadarache, France; [6]National Nuclear Laboratory, Preston Laboratory (A709), Springfields, Preston, Lancashire, UK; [7]Nuclear Futures Institute, Bangor University, Bangor, Gwynedd, UK; *Consorzio RFX, Padova, Italy

10.00 *CD-2:IL10* **Wear Resistance, High Temperature Stability and Electrical Conductivity in Air of Ti,Nb-Al-C MAX Phases-based Hot-pressed Bulks and Vacuum-arc Deposited Films**
T.A. PRIKHNA[1], T.B. SERBENYUK[1], O.P. OSTASH[2], A.S. KUPRIN[3], V.YA. PODHURSKA[2], V.B. SVERDUN[1], [1]Institute for Superhard Materials of the National Academy of Sciences of Ukraine, Kiev, Ukraine; [2]Karpenko Physical-Mechanical Institute of the National Academy of Sciences of Ukraine, Lviv, Ukraine; [3]National Science Center Kharkov Institute of Physics and Technology, Kharkov, Ukraine

10.30 *CD-2:IL11* **Hot Gas Corrosion of Ceramic Matrix Composites**
W. KUNZ, H. KLEMM, A. MICHAELIS, Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden, Germany

11.00 *Break*

Continued on next page

continued from preceding page

Chair: Diletta SCITI, Italy

11.20 *CD-3:IL01* **Ultra-high Temperature Mechanical and Thermal Properties of UHTCs**
W.G. FAHRENHOLTZ, G.E. HILMAS, Missouri University of Science and Technology, Materials Research Center, Rolla, MO, USA

11.50 *CD-3:IL03* **The Effect of Rare-earth based Additives on the Mechanical Properties of ZrB2-SiC Composites prepared by Reactive and Non-Reactive Sintering Route**
P. TATARKO[1], H. ÜNSAL[1], B. MATOVIĆ[2], Z. CHLUP[3], M. TATARKOVÁ[1], A. KOVALČÍKOVÁ[4], M. HIČÁK[1], I. DLOUHÝ[3], P. ŠAJGALÍK[1]; [1]Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava, Slovakia; [2]Centre of Excellence "CEXTREME LAB", Vinča Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade, Belgrade, Serbia; [3]Institute of Physics of Materials, Czech Academy of Sciences, Brno, Czech Republic; [4]Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic

12.20 *CD-3:IL06* **Thermal and Mechanical Properties of Zeta Phase Tantalum Carbide**
G.E. HILMAS, W.G. FAHRENHOLTZ, Missouri University of Science and Technology Rolla, MO, USA

12.50 *CD-3:L08* **Structure and Mechanical Characteristics of High Pressure Sintered ZrB2, HfB2 and ZrB2- TiB2, ZrB2-SiC Composite Materials**
T. PRIKHNA, A. LOKATKINA, V. MOSHCHIL, **M. KARPETS**, P. BARVITSKYI, O. BORYMSKYI, V. Bakul Institute for Superhard Materials of the National Academy of Sciences of Ukraine, Kiev, Ukraine

SYMPOSIUM CE

PROGRESS IN NANO-LAMINATED TERNARY CARBIDES, NITRIDES AND BORIDES (MAX/MAB) PHASES AND DERIVATIVES THEREOF (MXENES)

Room: **ASSISI B**

Chair: Thierry OUISSE, France

10.00 *CE-4:IL02* **Electrically Conductive Alumina-MXene Nanocomposite**
M. SOKOL, Tel Aviv University, Ramat Aviv, Israel

10.30 *CE-4:IL03* **Physical Vapour Deposition of MoAlB Thin Films and Direct MoBene Formation**
S. EVERTZ[1], P. PÖLLMANN[1], D.M. HOLZAPFEL[1], E. MAYER[1], R. SAHU[1, 2], D. BOGDANOVSKI[1], J.-O. ACHENBACH[1], C. SCHEU[2, 3], **J.M. SCHNEIDER**[1, 2], [1]Materials Chemistry, RWTH Aachen University, Aachen, Germany; [2]Max-Planck-Institut für Eisenforschung GmbH, Düsseldorf, Germany; [3]Materials Analytics, RWTH Aachen University, Aachen, Germany

11.00 *Break*

Chair: Clio AZINA, Germany

11.30 *CE-4:L04* **MXenes in Polymers and Nonpolar Solvents – Effects of Surface Modification on Stability and Dispersion**
M. CAREY, M.W. BARSOUM, Department of Materials Science and Engineering, Drexel University, Philadelphia, PA, USA

11.50 *CE-4:IL05* **Design of Functional Composites by Using MAX and MAB Phases**
S. GUPTA, University of North Dakota, Grand Forks, ND, USA

SYMPOSIUM CF

ADVANCES IN FUNCTIONAL MATERIALS FOR ENERGY HARVESTING, STORAGE AND SOLAR FUELS

Room: **SPOLETO A**

Chair: Renata SOLARSKA, Poland

9.30 *CF-1:IL05* **Advances in the Tailored Fabrication of Metal-oxide Nanoarchitectures for Safety, Environmental Applications and Sustainable Technologies**
D. BARRECA[1], A. GASPAROTTO[2], L. BIGIANI[2], C. MACCATO[2], [1]CNR-ICMATE and INSTM, Department of Chemical Sciences, Padova University, Padova, Italy; [2]Department of Chemical Sciences, Padova University and INSTM, Padova, Italy

10.00 *CF-2:IL01* **Solution-based Green Processing of Hybrid Perovskites for Solar Cell Applications**
F. ÜNLÜ[1], T. FISCHER[1], A. KULKARNI[2], T. MIYASAKA[2], **S. MATHUR**[1], [1]Institute of Inorganic Chemistry, University of Cologne, Cologne, Germany; [2]Graduate School of Engineering, Toin University of Yokohama, Aoba, Yokohama, Kanagawa, Japan

10.30 *CF-2:IL03* **Novel Photoanodes for Solar Fuels**
S. ESLAVA, M. REGUE, D. WALSH, J. ZHANG, I. POLI, U. HINTERMAIR, P.J. CAMERON, Imperial College London, London, UK

11.00 *Break*

Chair: Salvador ESLAVA, UK

11.30 *CF-2:IL06* **Boosting of Photo-induced Charge Carrier Dynamics in Semiconducting Systems**
R. SOLARSKA, K. BIENKOWSKI, Centre of New Technologies, University of Warsaw, Warsaw, Poland

12.00 *CF-2:IL07* **Interfacial Properties in Composite Nano-systems for Energy Harvesting**
A. VOMIERO, T. AHMED SHIFA, Division of Materials Science, Dept. of Engineering Sciences and Mathematics, Luleå University of Technology, Luleå, Sweden, and Department of Molecular Sciences and Nanosystems, Venezia Mestre, Italy

SYMPOSIUM CG

CERAMIC THIN FILMS AND COATINGS FOR PROTECTIVE, TRIBOLOGICAL AND MULTIFUNCTIONAL APPLICATIONS

Room: **SPOLETO B**

Chair: Michael DUGGER, USA

9.00 *CG-3:IL01* **Ceramic Superhydrophobic Coatings by Solution Precursor Plasma Spray**
T.W. COYLE, P. XU, J. MOSTAGHIMI, Centre for Advanced Coating Technologies, University of Toronto, Toronto, ON, Canada

9.30 *CG-3:IL04* **Thermal Spraying with Suspensions for Tribological Applications**
S. BJÖRKLUND, S. MAHADE, **S. JOSHI**, University West Trollhättan, Trollhättan, Sweden

10.00 *CG-3:IL07* **Developments in Cold Spray Coatings and 3D Material Architecture**
G.C. SAHA, Nano**com**posites and Mechanics Laboratory, University of New Brunswick, Fredericton, New Brunswick, Canada

10.30 *CG-3:IL08* **The New Frontier in Liquid Feedstock HVOF Thermal Spray: Porosity with Neutron Scattering and Performance of TBCs**
T. HUSSAIN, D. TEJERO-MARTIN, A. RINCON ROMERO, A. LYNAM, Coatings and Surface Engineering, Faculty of Engineering, University of Nottingham, Nottingham, UK

11.00 *Break*

Chair: Thomas COYLE, Canada

11.30 *CG-3:IL09* **Superlubricity and Superior Wear Resistance of 2D Materials: Recent Developments and Future Prospects**
A. ERDEMIR, Texas A&M University, Mechanical Engineering Department, College Station, TX, USA

12.00 *CG-3:IL10* **Status of Thermally Sprayed Hardmetal Coatings**
L.-M. BERGER, Fraunhofer IKTS, Dresden, Germany

12.30 *CG-3:IL11* **Tribological Behavior of Hard Metal Thermal Spray Coatings**
G. BOLELLI, L. LUSVARGHI, P. PUDDU, L. LUSVARGHI, V. TESTA, Dipartimento di Ingegneria "Enzo Ferrari", Università di Modena e Reggio Emilia, Modena, Italy; P. SASSATELLI, Il Sentiero International Campus S.r.l., Schio (VI), Italy

SYMPOSIUM CJ

MATERIALS DEMANDS TOWARDS NEXT GENERATION ELECTROCHEMICAL ENERGY STORAGE SYSTEMS

Room: **ORVIETO**

Chair: Marcel WEIL, Germany

9.30 *CJ-1:IL11* **How do We Address Safety of Li-ion Battery and Na-ion Battery?**
P. BALAYA, Department of Mechanical Engineering, Faculty of Engineering, National University of Singapore, Singapore

10.00 *CJ-1:L13* **Formulating Stable Electrolytes for the Metal Anode in Alkali Metal-Oxygen Batteries**
A.R. NEALE, CHIH-HAN YEN, L.J. HARDWICK, Stephenson Institute for Renewable Energy, University of Liverpool, Liverpool, UK; R. SHARPE, STEPHEN R. YEANDEL, P. GODDARD, K.V. LUZYANIN, Department of Chemistry, Loughborough University, Loughborough, UK; E.A. PETRUCCO, J. MATTHEY, Blounts Court Road, Sonning Common, Reading, UK

10.20 *CJ-1:IL14* **Insight into the Reactivity and Potential Profile across the Electrified Interface in All-Solid-State Batteries Enabled by Operando X-Ray Photoelectron/Absorption Spectroscopy**
X. WU, L. HÖLTSCH**I,** M. MIROLO, C.A.F. VAZ, C. BORCA, T. HUTHWELKER, P. NOVÁK, **M. EL KAZZI**, Paul Scherrer Institute, Villigen PSI, Switzerland

10.50 *Break*

Chair: Palani BALAYA, Singapore

11.20 *CJ-1:IL15* **Layered Oxide-based Electrodes for Na-ion Batteries**
E. REDONDO[1], M. ZARRABEITIA[2], I. RUIZ DE LARRAMENDI[1], D. SHANMUKARAJ[3], E. GOIKOLEA[1], **T. ROJO**[1], [1]Organic and Inorganic Chemistry Department, University of the Basque Country (UPV/EHU), Bilbao, Spain; [2]Helmholtz Institute Ulm (HIU), Ulm; Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; [3]Centre for Cooperative Research on Alternative Energies (CIC energiGUNE), Basque Research and Technology Alliance (BRTA), Alava Technology Park, Vitoria-Gasteiz, Spain

11.50 *CJ-1:IL16* **Molecular-level Understanding & Design of Positive Electrode Materials For Rechargeable Aluminum Batteries**
R.J. MESSINGER, The City College of New York, New York, NY, USA

SYMPOSIUM CM

DEVELOPMENT AND APPLICATION OF FUNCTIONAL TRANSPARENT CONDUCTING AND SEMICONDUCTING OXIDES

Room: **MONTEFALCO**

Chair: Hartwin PEELAERS, USA

9.30 *CM-2:IL04* **Searching for New Transparent Conducting and Electride Materials using High-throughput Computational Screening**
G. HAUTIER, Thayer school of Engineering, Dartmouth College, Hanover, NH, USA

10.00 *CM-2:IL05* **Electrochromism : Combination of Materials and Devices Architectures**
A. ROUGIER, ICMCB, Pessac, France

10.30 *CM-2:IL06* **Epitaxial Copper Iodide Thin Films grown by Pulsed Laser Deposition**
M. LORENZ, Universität Leipzig, Felix Bloch Institute for Solid State Physics, Leipzig, Germany

11.00 *Break*

Chair: Michael LORENZ, Germany

11.30 *CM-2:IL07* **Ga2O3-based Heterostructures for Various Polymorphs**
M. GRUNDMANN, Felix Bloch Institute for Solid State Physics, Universität Leipzig, Leipzig, Germany

12.00 *CM-2:IL08* **Epitaxial Growth Parameters for Phase Selection of Ga2O3 Epilayers**
R. FORNARI, P. MAZZOLINI, F. MEZZADRI, University of Parma, Parma, Italy; M. BOSI, L. SERAVALLI, IMEM-CNR Institute, Parma, Italy

12.30 *CM-2:IL09* **Stabilization of High-temperature Polymorphs of SrSnO3 at Room Temperature via Epitaxy**
B. JALAN, Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN, USA

SYMPOSIUM CN

GEOPOLYMERS, INORGANIC POLYMERS AND SUSTAINABLE MATERIALS

Room: **SALA RELATORI**

Chair: Marijana SERDAR, Croatia

9.30 *CN-3:IL01* **3D Printing of Geopolymer for Construction Applications**
B. NEMATOLLAHI, SHIN HAU BONG, Swinburne University of Technology, Hawthorn, Australia

10.00 *CN-3:IL02* **Geopolymer Beads and Applications**
E. PAPA, E. LANDI, V. MEDRI, CNR-ISTEC, Faenza, Italy

10.30 *CN-3:L04* **Influence of Metakaolins Reactivity on the Properties of Geopolymers**
W. N'CHO, J. JOUIN, S. ROSSIGNOL, IRCER, Institute for Research on Ceramics (UMR CNRS 7315), European Center for Ceramics, Limoges Cedex, France

10.50 *Break*

Chair: Rui M. NOVAIS, Portugal

11.20 *CN-3:IL06* **Geopolymer-based Heterogeneous Catalysts: Potential and Future Prospects**
M.I.M. AL-ZEER, M. ILLIKAINEN, Fibre and Particle Engineering Research Unit, University of Oulu, Oulu, Finland

11.50 *CN-3:L07* **Asymmetric Metakaolin-based Geopolymer Membranes: Synthesis and Characterization**
A. FILIPPONI, G. MASI, S. BANDINI, M.C. BIGNOZZI, University of Bologna, Department of Civil, Chemical, Environmental and Materials Engineering, Bologna, Italy

SYMPOSIUM CO

SCIENCE AND TECHNOLOGY FOR SILICATE CERAMICS

Room: **SPELLO**

Chair: Michele DONDI, Italy *(Convener)*

8.55 *Welcome*

9.00 *CO-1:IL01* **Wastes as Sustainable Raw Materials for the Manufacture of Fired Clay Bricks. Towards a Circular Economy**
P. MUÑOZ VELASCO, R. SANCHEZ-VÁZQUEZ, L. MUÑOZ-VELASCO, V. LETELIER-GONZALEZ, Universidad Internacional de La Rioja, Logroño, Spain

9.30 *CO-1:IL02* **Influence of Coal Ashes on Fired Clay Brick Quality using Random Forest Method**
M.V. VASIĆ[1], L.L. PEZO[2], Z.M. RADOJEVIĆ[1], [1]Institute for Testing of Materials IMS, Belgrade, Serbia; [2]University of Belgrade, Institute of General and Physical Chemistry, Belgrade, Serbia

10.00 *CO-1:L03* **Valorization of Eggshell Waste, as a Source of Calcium Carbonate, in Ceramic Wall Tiles**
I. VILARINHO, E. FILIPPI, M.P. SEABRA, CICECO - Aveiro Institute of Materials, Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal.

10.30 *CO-1:L04* **Exploring Waste-based Body Formulations for Porcelain Stoneware Tiles**
C. ZANELLI, S. CONTE, C. MOLINARI, G. GUARINI, **M. DONDI**, CNR-ISTEC, Faenza, Italy

10.50 *Break*

Chair: Maximina ROMERO, Spain

11.20 *CO-3:IL01* **New Challenges and Opportunities for Sustainable Ceramic Tiles Fighting Viruses and Bacteria**
E. RAMBALDI, ITALCER Group, Rubiera (RE), Italy

11.50 *CO-3:IL02* **Photo-catalytic Coatings for Water Treatment**
U. LAVRENCIC STANGAR, L. MATOH, B. ZENER, Faculty of Chemistry and Chemical Technology, University of Ljubljana, Slovenia; K. MAVER, University of Nova Gorica, Slovenia; I. ARCON, University of Nova Gorica, Slovenia and Jozef Stefan Institute, Ljubljana, Slovenia

12.20 *CO-3:IL03* **Textured Clay Composite Materials and Improved Mechanical Properties**
N. TESSIER-DOYEN, G. LECOMTE-NANA, I. DAOU, P. BLANCHART, J. BOURRET, D.S. SMITH, C. PEYRATOUT, R. GUINEBRETIÈRE, C. PAGNOUX, P.-M. GEFFROY, University of Limoges, Limoges Cedex, France

SYMPOSIUM CP

REFRACTORY MATERIALS CHALLENGES TO MEET CURRENT AND FUTURE INDUSTRY NEEDS

Room: **CORCIANO**

Chair: Christoph WÖHRMEYER, Germany

9.00 *CP-6:IL01* **Smart Bubbles for Cleaner Metals and Advanced Insulating Refractories**
L.O.Z. FALSETTI, T. DOS SANTOS JR., **V.C. PANDOLFELLI**, Materials Engineering Department, Federal University of São Carlos, São Carlos, SP, Brazil

9.30 *CP-6:IL02* **The Role of Phosphates in Chrome Oxide Gasifier Refractories**
J.P. BENNETT, **J. NAKANO**, A. NAKANO, H. THOMAS, U.S. Department of Energy National Energy Technology Laboratory, Albany, OR, USA

10.00 *CP-6:IL03* **The World of Monolithics: A Review of Last Developments and Way of Installation**
P. TASSOT, REFRATECHNIK Steel GmbH, Düsseldorf, Germany

10.30 *Break*

Chair: Andrie M. GARBERS-CRAIG, South Africa

11.00 *CP-6:IL04* **Freeze Linings vs Brick Linings in the Non-ferrous Metallurgy**
A. MALFLIET, S. VAN WINKEL, L. ZHANG, B. BLANPAIN, Department of Materials Engineering, KU Leuven, Heverlee, Belgium

11.30 *CP-6:IL05* **Carbon Bonded Foam Structures – Applications as High Temperature Reactive Filters in Combined Refining Filter-systems for Improved Steel Cleanliness**
C. ANEZIRIS, T. WETZIG, E. STORTI, J. HUBALKOVA, **P. GEHRE**, TU Bergakademie Freiberg, Germany

12.00 *CP-6:L06* **Field Assisted Sintering of Refractory Composite Materials Nb-/Ta-Al2O3 and the Influence on Material Properties**
B. KRAFT, S. WAGNER, M.J. HOFFMANN, KIT, Karlsruhe, Germany; D. ENDLER, TU Bergakademie Freiberg, Freiberg, Germany

12.20 *CP-6:L07* **Alumina Castables with Addition of Fibers Produced by Electrospinning**
E. STORTI[1], A. JIRÍCKOVÁ[2], S. DUDCZIG[1], J. HUBÁLKOVÁ[1], C.G. ANEZIRIS[1], [1]Institute of Ceramics, Refractories and Composite Materials, TU Bergakademie Freiberg, Freiberg, Germany; [2]University of Chemistry and Technology Prague, Department of Inorganic Chemistry, Prague, Czech Republic

CQ - 9th International Conference

ADVANCED INORGANIC FIBRE COMPOSITES FOR STRUCTURAL AND THERMAL MANAGEMENT APPLICATIONS

Room: **NORCIA**

Chair: Monica FERRARIS, Italy

9.30 *CQ-4:IL07* **Characterization and Modeling of High Temperature Mechanical Properties of CMCs with Silicon Carbide Matrix**
YUAN SHI, F. KESSEL, F, SÜSS, Institute of Structures and Design, German Aerospace Center Stuttgart, Stuttgart, Germany; K. TUSHTEV, Advanced Ceramics, University of Bremen, Bremen, Germany

10.00 *CQ-4:IL09* **Influence of Interphases on the Thermomechanical Behavior of CVI SiC/SiC Composites**
C. SAUDER, J. BRAUN, C. FELLAH, M-H. BERGER, E. BUET, CEA SACLAY, Gif-Sur-Yvette, France

10.30 *CQ-4:L10* **Thermophysical and Thermomechanical Characterization of Ceramic Matrix Composites for the Energy-intensive Industry**
L. LAGHI[1], **G. DE ALOYSIO**[1], C. MINGAZZINI[2], S. BASSI[3], M. SCAFÈ[2], P. FABBRI[2], A. NOETH[4], J. MAIER[4], [1]Certimac soc.cons. ar.l., Faenza - RA, Italy; [2]ENEA SSPT-PROMAS-TEMAF, Faenza - RA, Italy; [3]CNR-ISTEC, Faenza - RA, Italy; [4]Fraunhofer-Institute for Silicate Research ISC/Fraunhofer, Center for High Temperature Materials and Design, Bayreuth, Germany

10.50 *Break*

Chair: Walter KRENKEL, Germany

11.20 *CQ-5:IL02* **Microstructure-properties Relationships for the Machining of CMCs**
R. GOLLER, A. RÖSIER, P. LEON-PEREZ, Augsburg University of Applied Sciences, Augsburg, Germany

11.50 *CQ-5:IL03* **Studies on Carbon Fibrous Ablators: From Image-based Modeling to Experimental Determination of Reaction Constants from Plasma Jet Tests**
G.L. VIGNOLES, X. LAMBOLEY, P. BLAINEAU, C. LEVET, O. CATY, University of Bordeaux - CNRS - CEA - Safran : LCTS, Pessac, France; A. TURCHI, D. LE QUANG HUY, O. CHAZOT, Von Karman Institute, Rhode-Saint-Genèse, Belgium; D. BIANCHI, Università La Sapienza, Roma, Italy

SYMPOSIUM CA

ADVANCES IN PROCESSING SCIENCE AND MANUFACTURING OF HIGH PERFORMANCE CERAMICS AND COMPOSITES

Room: **ASSISI A**

Chair: Alexander MICHAELIS, Germany

14.30 *CA-6:IL03* **Sinter-cracking and Distortion Behaviors of Sintering 3D Printed Ceramics**
Z. CORDERO, Department of Aeronautics and Astronautics, MIT, Cambridge, MA, USA

15.00 *CA-6:L04* **A Colloidal Approach for the Fused Filament Fabrication: Multimaterial 3D Printing**
B. FERRARI, A. EGUILUZ, P. ORTEGA, O. URRA, J. YUS, A. FERRANDEZ-MONTERO, A.J. SANCHEZ-HERENCIA, Instituto de Ceramcia y Vidrio, CSIC, Madrid, Spain

15.20 *CA-6:L05* **Comparison of Thermoplastic Material Extrusion-based Additive Manufacturing Methods for the Shaping Ceramic Materials**
F. CLEMENS, A. HADIAN, Empa, Dübendorf, Switzerland

15.40 *CA-6:L06* **The Curing Performance of an Acrylate Resin Highly Loaded with an Ultraviolet (UV) Absorbing Ferrite Powder**
A. HARMON, M. ROUMANIE, U. SOUPREMANIEN, Univ Grenoble Alpes CEA LITEN DTNM, Grenoble, France; D. AUTISSIER, CEA Le Ripault, Monts, France

16.00 *CA-6:IL07* **Selection of Surfactants for Lithography Based Shaping of Zirconia and Zirconia/Alumina Nanocomposites**
T. GRAULE[1], P. ZUBRZYCKA[1], P. OZOG[2], L. CONTI[1], M. BORLAF[1], D. KATA[2], M. RADECKA[2], [1]Empa, Swiss Laboratories for Materials Science and Technology, Laboratory for High Performance Ceramics, Dübendorf, Switzerland; [2]AGH Krakow, Krakow, Poland

16.30 *CA-6:L11* **Comparing the Strength of Zirconia Disks Produced using Material Extrusion Additive Manufacturing and Cold Pressing**
A. HADIAN, F. CLEMENS, Empa, Dübendorf, Switzerland; M. FRICKE, A. LIERSCH, Hochschule Koblenz, Höhr-Grenzhausen, Germany

16.50 *CA-6:L12* **Large Scale Additive Manufacturing of Artificial Stone**
F. GOBBIN[1, 2], H. ELSAYED[1, 3], J. ADRIEN[4], G. FRANCHIN[1], A. ITALIANO[2], E. MAIRE[4], P. COLOMBO[1, 5], [1]University of Padova, Industrial Engineering Department, Padova, Italy; [2]Desamanera Srl, Rovigo, Italy; [3]Ceramics Department, National Research Centre, Cairo, Egypt; [4]Université de Lyon, INSA de Lyon, MATEIS CNRS UMR5510, Villeurbanne Cedex, France; [5]Department of Materials Science and Engineering, Pennsylvania State University, University Park, PA, USA

17.10 *Break*

Continued on next page

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Chair: Samuel BERNARD, France

17.30 *CA-5:IL02* **From Flash Sintering to Ultrafast Sintering without Electric Fields and Electrochemically Controlled Microstructural Evolution**
JIAN LUO, University of California, San Diego, la Jolla, CA, USA

18.00 *CA-5:IL03* **Flash Electrical Resistance Sintering of Tungsten Carbide**
V.M. SGLAVO, I. MAZO, University of Trento, Department of Industrial Engineering, Trento, Italy

18.30 *CA-5:L07* **Flash Spark Plasma Sintering on 3YSZ: Modification of Sintering Trajectories and Influence on the Formation of Grain Boundaries**
T. HERISSON DE BEAUVOIR[1], A. FLAUREAU[1], G. CHEVALLIER[1], A. WEIBEL[1], C. ELISSALDE[2], F. MAUVY[2], R. CHAIM[3], **C. ESTOURNES**[1], [1]CIRIMAT, CNRS-INP-UPS, Université Toulouse 3 - Paul Sabatier, Toulouse, France; 2CNRS, Université de Bordeaux, ICMCB, UMR 5026, Pessac, France; 3Department of Materials Science and Engineering, Technion - Israel Institute of Technology, Haifa. Israel

SYMPOSIUM CC

MODELLING, SIMULATION AND TESTING OF MECHANICAL AND THERMOMECHANICAL PROPERTIES OF BULK CERAMICS, COATINGS AND COMPOSITES

Room: **SALA STAMPA**

Chair: Junichi TATAMI, Japan

14.30 *CC-1:L10* **Simulation of Densification Behavior of Nano-powder in Final Sintering Stage**
BYUNG-NAM KIM, K. MORITA, T.S. SUZUKI, J.-G. LI, National Institute for Materials Science, Tsukuba, Ibaraki, Japan; H. MATSUBARA, Tohoku University, Japan

14.50 *CC-1:IL11* **Atomic-scale Investigations of Deformation Behavior of Ceramic Materials**
EITA TOCHIGI, Institute of Industrial Science, The University of Tokyo, Tokyo, Japan

15.20 *CC-1:L12* **Gas Pressure Sintered Si3N4: Extraction of the Sintering Parameters by In-situ Conventional Dilatometry**
T. GRIPPI[1, 2, 3], S. BEHAR-LAFENETRE[2], H. FRIEDRICH[3], D. HAAS[4], U. SCHENDERLEIN[4], C. MANIÈRE[1], S. MARINEL[1], [1]Normandie Univ, ENSICAEN, UNICAEN, CNRS, CRISMAT, Caen, France; [2]Thales Alenia Space, Cannes, France; [3]Fraunhofer HTL, Bayreuth, Germany; [4]FCTI, Rauenstein, Germany

15.40 *Break*

Chair: Michael REECE, UK

16.10 *CC-1:IL15* **Control of Dislocation Behavior to Improve Low Temperature Plasticity of Ceramic Materials**
A. NAKAMURA, Osaka University, Toyonaka, Osaka, Japan

16.40 *CC-1:IL16* **Unexpected Law for Grain Growth in Twinned Boron Carbide Ceramics Fabricated under Electric Field**
D. GÓMEZ GARCÍA, Department of Condense Matter Physics, CSIC, University of Seville, Seville, Spain; B.M. MOSHTAGHIOUN, Department of Condense Matter Physics, CSIC, University of Seville, Seville, Spain

SYMPOSIUM CE

PROGRESS IN NANO-LAMINATED TERNARY CARBIDES, NITRIDES AND BORIDES (MAX/MAB) PHASES AND DERIVATIVES THEREOF (MXENES)

Room: **ASSISI B**

Chair: Maxim SOKOL, Israel

14.30 *CE-5:IL01* **Contribution of Single Crystal Measurements to the Understanding of MAX Phase Electronic Properties**
T. OUISSE, D. PINEK, M. BARBIER, Y. KIM, Université Grenoble-Alpes, CNRS, LMGP, Grenoble, France; T. ITO, M. IKEMOTO, Nagoya University Synchrotron radiation Research Center (NUSR), Nagoya University, Nagoya, Japan; K. FURUTA, Graduate School of Engineering, Nagoya University, Nagoya, Japan; M. NAKATAKE, Aichi Synchrotron Radiation Center, Seto, Japan; K. YAJI, S. SHIN, Institute for Solid State Physics, University of Tokyo, Chiba, Japan; C. OPAGISTE, Université Grenoble-Alpes, Inst. NEEL, Grenoble, France; F. WILHELM, A. ROGALEV, European Synchrotron Radiation Facility (ESRF), Grenoble cedex, France

15.00 *CE-5:L03* **Growth and Characterization of Epitaxial (Cr1-xMnx)2GaC MAX Phase Thin Films by Pulsed Laser Deposition**
H. PAZNIAK[1], M. FARLE[1,2], U. WIEDWALD[1], [1]Faculty of Physics and Center for Nanointegration (CENIDE), University of Duisburg-Essen, Duisburg, Germany; [2]Kirensky Institute of Physics, Federal Research Center KSC SB RAS, Krasnoyarsk, Russia

15.20 *CE-5:L04* **The Magnetic Structure of Rare Earth i-MAX Phases Explored by Neutron Diffraction and Muon Spin Rotation**
D. POTASHNIKOV, IAEC, Tel-Aviv, Israel; O. RIVIN, A. PESACH, E.N. CASPI, NRCN, Beer-Sheva, Israel; Q. TAO, J. ROSÉN, Linköping University, Sweden; D. SHEPTYAKOV, Z. SALMAN, PSI, Switzerland; C. RITTER, ILL, France; H.A. EVANS, NIST, USA; P. BONFÁ, University of Parma, Italy; T. OUISSE, M. BARBIER, University Grenoble-Alps, France; A. KEREN, Technion, Israel

15.40 *CE-5:L05* **Non-collinear Antiferromagnetic Structure of the Mn2GaC Thin Film (MAX Phase) -evidenced by 55Mn NMR**
M. WOJCIK[1], E. JEDRYKA[1], J. DEY[1], R. KALVIG[1], U. WIEDWALD[2], R. SALIKHOV[2], M. FARLE[2], J. ROSEN[3], [1]Institute of Physics, Polish Academy of Sciences, Warsaw, Poland; [2]Faculty of Physics and Center for Nanointegration (CENIDE), University of Duisburg-Essen, Duisburg, Germany; [3]Thin Film Physics, Department of Physics, Chemistry and Biology (IFM), Linköping University, Linköping, Sweden

16.00 *Break*

Continued on next page

Continued from preceding page

Chair: Surojit GUPTA, USA

16.30 *CE-5:IL06* **Electronic Structure of Some Selected MAX Phases**
TAKAHIRO ITO, Nagoya University Synchrotron radiation Research center (NUSR), Nagoya University, Nagoya, Japan; K. FURUTA, Graduate School of Engineering, Nagoya University, Nagoya, Japan; D. PINEK, Y.-S. KIM, M. BARBIER, T. OUISSE, Université Grenoble-Alpes, CNRS, LMGP, Grenoble, France; M. NAKATAKE, Aichi Synchrotron Radiation Center, Seto, Japan; S. IDETA, K. TANAKA, Institute for Molecular Science, Okazaki, Japan; P. LE FÉVRE, F. BERTRAN, Synchrotron-SOLEIL, L'Orme des Merisiers, Saint-Aubin, France

17.00 *CE-5:IL07* **Magnetism in MAX and MAB Phases**
E.N. CASPI, Nuclear Research Centre - Negev, Beer-Sheva, Israel

17.30 *CE-5:L08* **Quantitative MXene Spectroscopy in TEM using ab initio Simulations**
T. BILYK[1], H.-W. HSIAO[2], R. YUAN[2], M. BUGNET[3], M.-L. DAVID[1], S. CÉLÉRIER[4], J.-M. ZUO[2], J. PACAUD[1], **V. MAUCHAMP**[1], [1]Pprime Institute –UPR 3346–CNRS, Poitiers University, ISAE-ENSMA, Department of Physics and Mechanics of Materials, Futuroscope-Chasseneuil, France; [2]Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA; [3]Université de Lyon, INSA Lyon, UCBL Lyon 1, MATEIS–UMR 5510 CNRS, Villeurbanne, France; [4]Institut de Chimie des Milieux et Matériaux de Poitiers (IC2MP), CNRS, Poitiers University, Poitiers, France

17.50 *CE-5:L09* **Energy Resolved Contributions of the Functionalization Groups on the Valence Band Spectra of the T3C2Tx MXene**
F. BRETTE[1, 2], H. PAZNIAK[1], R. LARCIPRETE[3], A. LIEDL[4], P. LACOVIG[5], D. LIZZIT[5], E. TOSI[5], F. BOUCHER[2], V. MAUCHAMP[1], [1]Institut Pprime, Poitiers, France; [2]Institut des Matériaux Jean Rouxel (IMN), Nantes, France; [3]CNR-Institut for Complex Systems (ISC), Italy; [4]INFN-LNF, Italy; [5]Elettra-Sincrotrone Trieste, Italy

SYMPOSIUM CH

POROUS CERAMICS FOR ENVIRONMENTAL PROTECTION, ENERGY-RELATED TECHNOLOGIES AND ADVANCED INDUSTRIAL CYCLES

Room: **SPOLETO B**

Chair: Michael SCHEFFLER, Germany

14.30 *CH-2:IL01* **CO2 Absorption in Porous Geopolymers**
V. MEDRI, E. PAPA, E. LANDI, CNR-ISTEC Faenza, Italy; A. VACCARI, M. MINELLI, University of Bologna, Bologna, Italy

15.00 *CH-2:IL02* **Structured Porous Ammonia Carriers for the Automotive Selective Catalytic Reduction (SCR) System**
F. AKHTAR, Division of Materials Science, Luleå University of Technology, Luleå, Sweden

15.30 *CH-2:IL03* **Capillary Transport in Freeze Cast SiOC Ceramics**
D. SCHUMACHER[1], P. BRAUN[1], HUIXING ZHANG[1], M. DREYER[2], K. REZWAN[1, 3], **M. WILHELM**[1], [1]Advanced Ceramics, University of Bremen, Germany; [2]Applied space technology and microgravity, University of Bremen, Germany; [3]MAPEX-Centre for Materials and Processes, University of Bremen, Germany

16.00 *Break*

Chair: Gideon GRADER, Israel

16.30 *CH-3:IL02* **Ceramic Foams with High Phonon Conductivity**
U. BETKE, D. CHAZARO MENDOZA, M. SCHEFFLER, Otto-von-Guericke-University Magdeburg, Magdeburg, Germany

17.00 *CH-3:L03* **Fabrication of Ultra High Porosity Nanofibrous Ceramic Structures in Zirconia-Titania System**
R. YAGER, S. NEALY, R. DAY, C. SEVERINO, A. STANISHEVSKY, University of Alabama at Birmingham, Birmingham, AL, USA

17.20 *CH-3:IL05* **Mechanical Properties of Porous Ceramics: New Insights in Fracture and Crack Propagation Behaviour**
S. MEILLE, Université de LYON, INSA DE LYON, UNIV. LYON 1, CNRS, MATEIS UMR5510, VILLEURBANNE, FRance

SYMPOSIUM CI
PROGRESS IN ELECTROCERAMICS RESEARCH

Room: **MAGIONE A**

Chair: Charlotte COCHARD, UK

15.00 *CI-3:IL01* **Designing Multiferroic Perovskite Oxides with Phase-Change Magnetoelectric Responses**
H. AMORÍN, M. ALGUERÓ, J.A. QUINTANA-CILLERUELO, A. CASTRO, Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Cantoblanco, Madrid, Spain; C.M. FERNÁNDEZ-POSADA, University of Cambridge, Downing Street, Cambridge, UK

15.30 *CI-3:IL03* **Magnetoelectric Ceramic Layered Composites: Causes behind Variability beyond Interface Quality**
M. ALGUERO, H. AMORÍN, A. CASTRO, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC), Cantoblanco, Madrid, Spain; P. RAMOS, Departamento de Electrónica, Universidad de Alcalá, Alcalá de Henares, Spain; R. MORENO, Instituto de Cerámica y Vidrio (ICV-CSIC), Cantoblanco, Madrid, Spain; M. VENET, Departamento de Física, Universidade Federal de São Carlos, São Carlos, SP, Brazil

SYMPOSIUM CK

SOLID OXIDE FUEL CELLS: MATERIALS AND TECHNOLOGY CHALLENGES

Room: **ORVIETO**

Chair: Scott BARNETT, USA

14.30 *CK-3:IL01* **Highly Performing and Stable Proton-conducting Steam Solid Oxide Electrolysis Cell with Triple-conductive Ruddlesden-Popper Phase Anode**
WENYUAN LI, **XINGBO LIU**, West Virginia University, Mechanical & Aerospace Engineering Department, Morgantown, WV, USA

15.00 *CK-3:IL02* **Ex-situ Artificial Aging – An Effective Tool for Solid Oxide Cells Accelerated Stress Tests**
D. VLADIKOVA, B. BURDIN, A. SHEIKH, M. KRAPCHANSKA, IEES-BAS, Sofia, Bulgaria; P. PICCARDO, University of Genoa, Genoa, Italy; D. MONTINARO, SOLIDpower S.p.A, Mezzolombardo, Italy

15.30 *CK-3:L05* **A Simple Approach to make the Commercial Solid Oxide Fuel Cells Flexible in the Use of Fuels**
S. CAMPAGNA ZIGNANI, **M. LO FARO**, A.S. ARICÒ, Institute of Advanced Energy Technologies (ITAE) of the Italian National Research Council (CNR), Messina, Italy

15.50 *Break*

Chair: Glenn MATHER, Spain

16.20 *CK-4:IL03* **Freeze Tape-casted and In Situ-decorated Solid Oxide Cells for Reversible Applications**
P. CARPANESE[1], D. CADEMARTORI[1], D. CLEMATIS[1], A.M. ASENSIO[1], S. PRESTO[2], M. VIVIANI[2], A. BARBUCCI[1,2], [1]Department of Civil, Chemical and Environmental Engineering (DICCA), University of Genova, Genova, Italy; [2]Institute of Condensed Matter Chemistry and Technology for Energy (ICMATE), National Research Council (CNR), c/o DICCA-UNIGE, Genova, Italy

16.50 *CK-4:IL06* **SOFC Development in Jülich / Utilization of Bio-Syngas in Solid Oxide Fuel Cell Stacks**
C. LENSER[1], H. JEONG[1,3], M. HAUSER[2], S. FENDT[2], F. FISCHER[2], M. HAUCK[2], S. HERRMANN[2], H. SPLIETHOFF[2], O. GUILLON[4], N.H. MENZLER[1], [1]Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research - Materials Synthesis and Processing (IEK-1), Jülich, Germany; [2]Technische Universität München, Chair of Energy Systems, Garching, Germany; [3]Korea Institute of Ceramic Engineering and Technology (KICET), Engineering Ceramic Center, Seoul, South Korea; [4]Jülich Aachen Research Alliance: JARA-Energy, Jülich, Germany

SYMPOSIUM CL

INORGANIC MATERIALS SYSTEMS FOR ADVANCED PHOTONICS

Room: **CORCIANO**

Chair: Jean-Luc ADAM, France

14.30 *CL-1:IL04* **Nonlinear Optics in Whispering Gallery Mode Microresonators**
D. FARNESI[1], X. ROSELLO-MECHO[2], M. DELGADO-PINAR[2], M.V. ANDRÉS[2], G. RIGHINI[1], G. NUNZI CONTI[1], S. SORIA[1], [1]IFAC-CNR, Institute of Applied Physics "N. Carrara", Sesto Fiorentino (FI), Italy; [2]Dep. of Applied Physics and Electromagnetism-ICMUV, University of Valencia, Burjassot, Spain

15.00 *CL-5:IL01* **Integrated Photonics for Biomedical Spectroscopy**
J.S. WILKINSON, Optoelectronics Research Centre, University of Southampton, Southampton, UK

15.30 *CL-5:IL02* **Manipulation of Light-matter Interaction on the Nanoscale**
S. CUNNINGHAM, C. HRELESCU, **A.L. BRADLEY**, School of Physics, Trinity College Dublin, College Green, Dublin, Ireland

16.00 *Break*

Chair: James S. WILKINSON, UK

16.30 *CL-5:IL03* **Sensing Systems based on Optical Resonators**
T. IOPPOLO, College of Engineering and Computing Sciences, New York Institute of Technology, Old Westbury, NY, USA

17.00 *CL-5:L04* **RF - Sputtering Fabrication of Flexible SiO2/HfO2 Glass-based 1D Photonic Crystals and Planar Waveguides**
A. CARLOTTO[1, 2], S.M. PIETRALUNGA[2], L.T.N. TRAN[1, 2, 3], O. SAYGINER[4], E. IACOB[5], A. SZCZUREK[1, 6], S. VARAS[1], J. KRZAK[6], O.S. BURSI[8, 1], D. ZONTA[7, 1], A. LUKOWIAK[8], G.C. RIGHINI[9], M. FERRARI[1], **A. CHIASERA**[1], [1]IFN-CNR CSMFO Lab. and FBK Photonics Unit, Povo, Trento, Italy; [2]IFN-CNR, Milano, Italy; [3]Dept. of Materials Technology, Fac. of Applied Sciences, Ho Chi Minh City University of Technology and Education, Thu Duc District, Ho Chi Minh City, Vietnam; [4]The Technical University of Munich, TranslaTUM, München, Germany; [5]Fondazione Bruno Kessler, Centre for Materials and Microsystems, Micro Nano Facility, Povo, Trento, Italy; [6]Dept. of Mechanics, Materials and Biomedical Eng., Wroclaw University of Science and Technology, Wroclaw, Poland; [7]Dept. of Civil, Environmental and Mechanical Eng., University of Trento, Mesiano, Trento, Italy; [8]Institute of Low Temperature and Structure Research, PAS, Wroclaw, Poland; [9]MiPLab, IFAC-CNR, Sesto Fiorentino, Italy

17.20 *CL-5:IL05* **Tellurite Glass Devices Integrated on Silicon Photonic Chips**
J. BRADLEY, Department of Engineering Physics, McMaster University, Hamilton, Ontario, Canada

SYMPOSIUM CM

DEVELOPMENT AND APPLICATION OF FUNCTIONAL TRANSPARENT CONDUCTING AND SEMICONDUCTING OXIDES

Room: **MONTEFALCO**

Chair: Roberto FORNARI, Italy

14.30 *CM-2:IL10* **Solution Processed ITO Thin Films for Optoelectronic Applications**
R.A. GERHARDT, N. XIA, S. SETHURAMAN, S. JOSHI, Georgia Institute of Technology, Atlanta, GA. USA

15.00 *CM-2:IL11* **Combinatorial Epitaxial Growth and High-throughput Physical Property Screening of Monoclinic, Orthorhombic and Rhombohedral Ternary Group-III Sesquioxide Alloys**
H. VON WENCKSTERN, M. KNEISS, A. HASSA, C. STURM, D. SPLITH, M. LORENZ, M. GRUNDMANN, Felix-Bloch-Institut für Festkörperphysik, Universität Leipzig, Leipzig, Germany

15.30 *Break*

Chair: Julia E. MEDVEDEVA, USA

16.00 *CM-3:IL01* **Transparent Conducting Materials for High Efficiency Solar Cells**
M. MORALES-MASIS, MESA+ Institute, University of Twente, Enschede, The Netherlands

16.30 *CM-3:IL02* **Resolving the Metal Insulator Transition Mechanism for Nb Oxides for Memristor Applications**
WEI-CHENG LEE, L.F.J. PIPER, Department of Physics, Applied Physics, and Astronomy, Binghamton University, Binghamton, NY, USA

17.00 *CM-3:IL03* **Flexible and Autonomous Electronics using Sustainable Thin Film and Nanostructured Oxides**
A. ROVISCO, A. SANTA, M. PEREIRA, J. MARTINS, R. BRANQUINHO, R. IGREJA, E. FORTUNATO, R. MARTINS, **P. BARQUINHA**, i3N/CENIMAT, Department of Materials Science, NOVA School of Science and Technology and CEMOP/UNINOVA, NOVA University Lisbon, Campus de Caparica, Caparica, Portugal.

SYMPOSIUM CO

SCIENCE AND TECHNOLOGY FOR SILICATE CERAMICS

Room: **SPELLO**

Chair: Elisa RAMBALDI, Italy

14.30 *CO-1:IL05* **A New Paradigm to Satisfy the Global Expectation of Economically Reasonable Slip Resistance Life Cycle Performance**
R. BOWMAN, Intertile Research, Brighton East, VIC, Australia

15.00 *CO-1:IL06* **Circular Economy in Ceramic Production: Examples**
L. PEREZ VILLAREJO, S. BUENO-RODRÍGUEZ, D. ELICHE-QUESADA, Department of Chemical, Environmental, and Materials Engineering, Higher Polytechnic School of Jaén, University of Jaen, Jaén, Spain

15.30 *CO-1:L07* **Bottom Ashes from Biomass Combustion as Secondary Raw Materials in Porcelain Stoneware Bodies**
S. CONTE[1], D. BUONAMICO[2], T. MAGNI[2], R. ARLETTI[2], M. DONDI[1], G. GUARINI[1], C. ZANELLI[1], [1]ISTEC-CNR, Faenza, Italy; [2]Università degli Studi di Modena e Reggio Emilia, Italy

15.50 *Break*

Chair: Richard BOWMAN, Australia

16.20 *CO-2:IL01* **Ceramic Frit Containing Copper Slags: Application and Life Cycle Assessment**
C. SILIGARDI, Department of Engineering Enzo Ferrari, University of Modena and Reggio Emilia, Modena, Italy; A.M. FERRARI, Department of Sciences and Methods for Engineering, University of Modena and Reggio Emilia, Reggio Emilia, Italy

16.50 *CO-2:IL02* **A New Concept for Inkjet Technology-based Coatings**
J.L. AMORÓS, **A. MORENO**, E. BLASCO, Instituto de Tecnología Cerámica (ITC), Asociación de Investigación de las Industrias Cerámicas (AICE), Universitat Jaume I de Castellón, Castellón, Spain

17.20 *CO-2:L03* **Effect of Ink Micronization on Pigments Physical and Technological Properties**
C. MOLINARI, C. ZANELLI, S. CONTE, M. DONDI, CNR-ISTEC, Faenza, Italy; M. ARDIT, G. CRUCIANI, Dept. Physics and Earth Sciences, University of Ferrara, Ferrara, Italy

17.40 *CO-2:L05* **High Reflective Engobes for Ink-jet Printed Colored Porcelain Stoneware Tiles**
E.I. CEDILLO-GONZÁLEZ, M. GOVERNATORI, C. SILIGARDI, Department of Engineering "Enzo Ferrari", University of Modena and Reggio Emilia, Modena, Italy

CQ - 9th International Conference

ADVANCED INORGANIC FIBRE COMPOSITES FOR STRUCTURAL AND THERMAL MANAGEMENT APPLICATIONS

Room: **NORCIA**

Chair: Mrityunjay SINGH, USA

15.00 *CQ-6:IL01* **C/C-SiC Composites for Next-generation Brake Disks**
W. KRENKEL, T. OPEL, N. LANGHOF, University of Bayreuth, Bayreuth, Germany

15.30 *CQ-6:IL02* **Silicon carbide and Silicon carbide based Fiber Composites for Fusion**
M. FERRARIS, Politecnico di Torino, Torino, Italy

16.00 *CQ-6:IL03* **HB-Cesic Mirrors and Telescopes - From Design to Alignment**
M.R. KROEDEL, Y. BASKARAN, ECM Engineered Ceramic Materials GmbH, Moosinning, Germany

SYMPOSIUM CA

ADVANCES IN PROCESSING SCIENCE AND MANUFACTURING OF HIGH PERFORMANCE CERAMICS AND COMPOSITES

Room: **ASSISI A**

Chair: Dusan GALUSEK, Slovakia

9.00 *CA-5:IL06* **Impact of Electric Fields on Microstructure Evolution in Functional Oxides**
W. RHEINHEIMER, FZ Jülich, Germany; RWTH Aachen University, Germany; Karlsruhe Institute of Technology, Germany; TU Darmstadt, Germany ; Purdue University, Germany

9.30 *CA-5:L11* **Sintering of Lead-free Functional Perovskites by Cool-SPS**
L. FAURE, U-C. CHUNG, F. MOLINARI, M. SUCHOMEL, M. MAGLIONE, M. JOSSE, ICMCB-UB-CNRS, UMR5026, Pessac, France

9.50 *CA-5:L13* **Developing in situ Characterization of Cold Sintering Process Mechanisms by Impedance Spectroscopy Measurements**
T. HERISSON DE BEAUVOIR, P-L. TABERNA, P. SIMON, C. ESTOURNÈS, CIRIMAT, Université de Toulouse, CNRS, Université Toulouse 3 - Paul Sabatier, Toulouse, France

10.10 *Break*

Chair: Rajendra K. BORDIA, USA

10.40 *CA-7:IL02* **Ceramics with Eutectic Microstructure by Viscous Flow Sintering and Controlled Crystallization of Al2O3-Y2O3 and Al2O3-Y2O3-ZrO2 Glass**
D. GALUSEK, Centre for Functional and Surface Functionalized Glass, Alexander Dubček University of Trenčín, Trenčín, Slovakia

11.10 *CA-7:L04* **Optical in-Line 3D-Quality Inspection Using White-Light Interferometry for CMC Aerospace Applications**
J. MACKEN, R. GOLLER, Augsburg University of Applied Sciences, Dept of Mechanical and Process Engineering, Augsburg, Germany

11.30 *CA-7:IL05* **A Practical Overview of Colloidal Strategies to Manufacture ad-hoc Designs of Advanced 2D and 3D Structures**
Z. GONZALEZ[1, 2] J. YUS[1], E. USALA[2], P. ORTEGA-COLUMBRANS[1], E. ESPINOSA[2], A. RODRÍGUEZ[2], A.J. SANCHEZ-HERENCIA[1], B. FERRARI[1], [1]Instituto de Ceramica y Vidrio (ICV), CSIC, Madrid, Spain; [2]BioPren Group. Chemical Engineering Dept, Faculty of Science, Campus de Rabanales, Universidad de Cordoba, Cordoba, Spain

12.00 *CA-7:L07* **Novel Entropy-stabilized Ni-free Rock Salt Ceramics**
M. BIESUZ, V.M. SGLAVO, University of Trento, Dept of Industrial Engineering, Trento, Italy

12.20 *CA-7:L08* **Improving Mechanical Properties of Laminated Transparent Ceramics by Engineering Residual Stress Profiles**
A. TALIMIAN, D. GALUSEK, Centre for Functional and Surface Functionalised Glass, A. DUBCEK, University of Trencin, Trencin, Slovakia; A. NAJAFZADEH, Joint Glass Centre of the IIC SAS, TnUAD and FChPT STU, Trencin, Slovakia; V. POUCHLY, K. MACA, CEITEC BUT, Brno University of Technology, Brno, Czech Republic

Focused Session CA-12

CERAMIC JOINING: FROM MACRO- TO NANO-LENGTH SCALES

Room: **MAGIONE A**

Chair: Monica FERRARIS, Italy *(Convener)*

10.40 *Welcome*

10.45 *CA-12.1:IL01* **Agglomeration of Thin Metal Bilayer Films**
K. VAN BENTHEM, Department of Materials Science and Engineering, University of California, Davis, Davis, CA, USA

11.15 *CA-12.2:IL01* **Advanced Routes for Brazing SiC: Wetting and Interfacial Phenomena**
F. VALENZA, S. GAMBARO, M.L. MUOLO, A. PASSERONE, CNR-ICMATE, Genova, Italy

11.45 *CA-12.2:IL02* **Active Metal Brazing of Alumina**
K.M. KNOWLES, M. ALI, University of Cambridge, Department of Materials Science and Metallurgy, Cambridge, UK; P.M. MALLINSON, AWE plc, Aldermaston, Reading, Berkshire, UK; J.A. FERNIE, School of Science, Engineering & Design, Stephenson Building, Teesside University, Tees Valley, UK

12.15 *CA-12.2:L03* **Interfacial Energy as the Driving Force for Diffusion Bonding of Ceramics**
S. KOVACEVIC, **S.Dj. MESAROVIC**, School of Mechanical and Materials Engineering, Washington State University, Pullman, USA; R. PAN, Laser Materials Processing Research Center, School of Materials Science and Engineering, Tsinghua University, Beijing, China; D.P. SEKULIC, Department of Mechanical Engineering, College of Engineering, University of Kentucky, Lexington, KY, USA; State Key Laboratory of Advanced Welding and Joining, School of Materials Science and Engineering, Harbin Institute of Technology, Harbin, China

12.35 *CA-12.2:L06* **Atmospheric Plasmas for Improving Mechanical Performances of Joined SiC Components**
A. DE ZANET, M. SALVO, V. CASALEGNO, Department of Applied Science and Technology (DISAT), Politecnico di Torino, Italy

SYMPOSIUM CC

MODELLING, SIMULATION AND TESTING OF MECHANICAL AND THERMOMECHANICAL PROPERTIES OF BULK CERAMICS, COATINGS AND COMPOSITES

Room: **SALA STAMPA**

Chair: Daolun CHEN, Canada

9.30 *CC-2:IL02* **CMAS Induced Microstructure Degradation of Thermal Barrier Coatings for Application in Gas Turbine Environments**
D.E. MACK[1], G. BRUNO[2, 3], O. HELLE[1], O. JARLIGO[1], J. MALZBENDER[4], B.R. MÜLLER[2], R. VASSEN[1], [1]IEK-1, Forschungszentrum Jülich GmbH, Jülich, Germany; [2]BAM, Bundesanstalt für Materialforschung und -Prüfung, Berlin, German; [3]University of Potsdam, Institute of Physics and Astronomy, Potsdam, Germany; [4]IEK-2, Forschungszentrum Jülich GmbH, Jülich, Germany

10.00 *CC-3:IL01* **Interfacial Fracture Toughness on SiC/SiC CMCs**
O. GAVALDA-DIAZ, L. VANDEPERRE, E. SAIZ, F. GIULIANI, Centre of Advanced Structural Ceramics, Department of Materials, Imperial College London, London, UK

10.30 *Break*

Chair: Pavol SAJGALIK, Slovakia

11.00 *CC-3:IL04* **Residual Stresses and Texture Characteristics in Si3N4 Ceramic Composites**
C.C. YE, School of Mechanical-Electronic and Vehicle Engineering, Weifang University, Weifang, Shandong, China; H.Q. RU, Key Laboratory for Anisotropy and Texture of Materials (Ministry of Education), Institute of Ceramics and Powder Metallurgy, School of Materials Science and Engineering, Northeastern University, Shenyang, Liaoning, China; **DAOLUN CHEN**, Department of Mechanical and Industrial Engineering, Ryerson University, Toronto, Ontario, Canada

11.30 *CC-3:IL05* **Damage and Stress Evolution in Multi-phase Metal Matrix Composites**
G. BRUNO, S. EVSEVLEEV, T. MISHUROVA, S. CABEZA, BAM, Berlin, Germany; G. GARCES, CENIM, CSIC, Madrid, Spain; G.REQUENA, DLR, Cologne, Germany; I. SEVOSTIANOV, NMSU, Las Cruces, NM, USA

SYMPOSIUM CD

HIGH AND ULTRA HIGH TEMPERATURE CERAMICS AND COMPOSITES FOR EXTREME ENVIRONMENTS

Room: **MAGIONE B**

Chair: William G. FAHRENHOLTZ, USA

9.30 *CD-4:IL01* **First Principles Simulations of Entropy Stabilized UHTCs**
M. LIM, S. DAIGLE, Z. RAK, **D.W. BRENNER**, Department of Materials Science and Engineering North Carolina State University Raleigh, NC, USA

10.00 *CD-4:IL03* **Strong Boride Hierarchical Composites for Ultra-high Temperature Applications**
L. SILVESTRONI[1], N. GILLI[1,2], A. MIGLIORI[2], D. SCITI[1], J. WATTS[3], G.E. HILMAS[3], W.G. FAHRENHOLTZ[3], [1]CNR-ISTEC, Institute of Science and Technology for Ceramics, Faenza, Italy; [2]CNR-IMM, Institute for Microelectronics and Microsystems, Bologna, Italy; [3]Department of Materials Science and Engineering, Missouri University of Science and Technology, MO, Rolla, USA

10.30 *CD-4:IL04* **Computational Studies of the Phase Stability of UHTC Transition Metal Carbides and Nitrides**
C.R. WEINBERGER, Colorado State University, Fort Collins, CO, USA; XIAO-XIANG YU, North Western University, Evanston, IL, USA; G. THHOMPSON, The University of Alabama, Tuscaloos, AL, USA

SYMPOSIUM CE

PROGRESS IN NANO-LAMINATED TERNARY CARBIDES, NITRIDES AND BORIDES (MAX/MAB) PHASES AND DERIVATIVES THEREOF (MXENES)

Room: **ASSISI B**

Chair: El'ad CASPI, Israel

9.30 *CE-6:IL04* **MXene Chemistry: Fundamentals and Applications**
V.N. MOCHALIN, Department of Chemistry and Department of Materials Science & Engineering, Missouri University of Science & Technology, MO, USA

10.00 *CE-6:L06* **Electrochemical Investigation on Anti-corrosion Behavior of Functionalized 2D Mxene Reinforced Powder Coating Nanocomposites**
Z. NAZARLOU, U. AYDEMIR, Department of Chemistry, Koç University, Sariyer, Istanbul, Turkey; M.S.S. DORRAJI, Department of Chemistry, University of Zanjan, Zanjan, Iran

10.20 *CE-7:L01* **MXene for Electrochemical Water Desalination**
M. TORKAMANZADEH, L. WANG, Y. ZHANG, INM - Leibniz Institute for New Materials, Saarbrücken, Germany; Saarland University, Saarbrücken, Germany; V. PRESSER, INM - Leibniz Institute for New Materials, Saarbrücken, Germany. Saarland University, Saarbrücken, Germany. Saarene - Saarland Center for Energy Materials and Sustainability, Saarbrücken, Germany

10.40 *Break*

Chair: Michel BARSOUM, USA

11.10 *CE-7:IL02* **Highly Conductive MXene for Electronics: From Fundamental to Applications**
SHUN SAKAIDA, F. NARUSE, T. TORITA. Murata Manufacturing Co., Ltd., Shiga, Japan

11.40 *CE-7:IL03* **Pre-Intercalated Multi-layer MXenes as Outstanding Electrodes for Electrochemical Energy Storage**
KUN LIANG, K. PRENGER, **M. NAGUIB**, Department of Physics and Engineering Physics, Tulane University, New Orleans, Louisiana, USA

12.10 *CE-7:IL05* **Tuning the MXene Surface Chemistry with the Etching Agent. Application in Electrocatalysis**
M. BENCHAKAR, L. LOUPIAS, C. CANAFF, S. MORISSET, C. MORAIS, A. HABRIOUX, **S. CÉLÉRIER**, IC2MP, Poitiers, France; T. BILYK, J. PACAUD, P. CHARTIER, V. MAUCHAMP, Pprime, Poitiers, France

SYMPOSIUM CF

ADVANCES IN FUNCTIONAL MATERIALS FOR ENERGY HARVESTING, STORAGE AND SOLAR FUELS

Room: **SPOLETO A**

Chair: Sanjay MATHUR, Germany

9.30 *CF-2:L11* **Study of Charge Carrier Dynamics in TiO2 Thin Films by Time Resolved Transient Absorption Spectroscopy**
RAMSHA KHAN, H. ALI-LÖYTTY, A. TUKIAINEN, N.V. TKACHENKO, Photonic Compounds and Nanomaterials Group, Faculty of Engineering and Natural Sciences, Tampere University, Tampere, Finland

9.50 *CF-2:L14* **Incorporation of Spark Ablation and Nanoscale 3D Printing for Deriving Nanostructured Layers**
I. PANZIC[1], A. JELINEK[2], F. RADOVANOVIĆ-PERIĆ[1], D. KIENER[2], V. MANDIĆ[1], [1]Faculty of Chemical Engineering and Technology, Zagreb, Croatia; [2]Department of Materials Physics, Montanuniversität Leoben, Leoben, Austria

10.10 *CF-2:L16* **Titania Thin Films, Photocatalytically Efficient Under Visible Light Illumination**
B. ŽENER, L. MATOH, **R. CERC KOROŠEC**, Faculty of Chemistry and Chemical Technology, University of Ljubljana, Ljubljana, Slovenia

10.30 *CF-3:L03* **Implementing Ordered Arrays of Zincite Nanoformations into Transport Layers of Perovskite Photovoltaic Devices**
V. MANDIĆ, I. PANŽIĆ, F. RADOVANOVIĆ-PERIĆ, Faculty of Chemical Engineering and Technology, Zagreb, Croatia; T. RATH, Institute for Chemistry and Technology of Materials, Graz, Austria

10.50 *CF-2:IL10* **Semiconducting Metal Oxide Nanostructures for Water Splitting and Photovoltaics**
I. CONCINA, Luleå University of Technology, Luleå, Sweden

SYMPOSIUM CG

CERAMIC THIN FILMS AND COATINGS FOR PROTECTIVE, TRIBOLOGICAL AND MULTIFUNCTIONAL APPLICATIONS

Room: **SPOLETO B**

Chair: Shrikant JOSHI, Sweden

9.00 *CG-4:IL01* **Coatings for Protection of Aero Engine Components**
U. SCHULZ, German Aerospace Center, Institute of Materials Research Linder Hoehe, Cologne, Germany

9.30 *CG-4:IL03* **Environmental Barrier Coatings made by Atmospheric Plasma Spraying (APS)**
R. VASSEN, D. ZHOU, E. BAKAN, Forschungszentrum Jülich GmbH, IEK-1, Jülich, Germany

10.00 *CG-4:IL04* **Advanced Suspension Plasma Sprayed Thermal Barrier Coatings**
M. GUPTA, University West, Trollhättan, Sweden; X.-H. LI, Siemens Energy, Finspång, Sweden; B. KJELLMAN, GKN Aerospace, Trollhättan, Sweden

10.30 *Break*

Chair: Sanjay SAMPATH, USA

10.45 *CG-4:IL05* **Failure of Thermally Sprayed 7YSZ Coatings during Cyclic Loading of Microcantilevers**
D. LAL[1], P. KUMAR[1], S. SAMPATH[2], **V. JAYARAM**[1], [1]Department of Materials Engineering, Indian Institute of Science, Bangalore, India; [2]Centre for Thermal Spray Research, University of Stony Brook, NY, USA

11.15 *CG-4:IL06* **Characterisation of Thermal and Environmental Barrier Coatings for Lifetime Extension**
PING XIAO, University of Manchester and Henry Royce Institute, Manchester, UK

11.45 *CG-4:IL09* **Compositional and Structural Stability of Compositionally Complex Rare-Earth Oxides Under Thermal and Corrosion Exposures**
N. MOTLEY, **D.R. MUMM**, University of California at Irvine, Irvine, CA, USA

12.15 *CG-4:L10* **Corrosion of EBCs by CMAS: Reactivity of Rare-earth Silicates**
J. BONNAL, C. PETITJEAN, P.J. PANTEIX, Université de Lorraine, CNRS, IJL, Nancy, France; S. ARNAL, E. BOUILLON, Safran Ceramics, Mérignac, France; M. VILASI, Université de Lorraine, CNRS, IJL, Nancy, France

12.35 *CG-4:IL12* **Multilayerered, Multifunctional Thermo-structural coatings Enabled by Layered Manufacturing**
S. SAMPATH, Center for Thermal Spray Research Stony Brook University, Stony Brook, NY, USA

SYMPOSIUM CH

POROUS CERAMICS FOR ENVIRONMENTAL PROTECTION, ENERGY-RELATED TECHNOLOGIES AND ADVANCED INDUSTRIAL CYCLES

Room: **SALA RELATORI**

Chair: Paolo COLOMBO, Italy

9.00 *CH-4:IL02* **Shrinkage and Distribution of Water during Drying of Ceramic Green Bodies**
B. NAIT-ALI, S. OUMMADI, N. LAURO, A. ALZINA, D.S. SMITH, University of Limoges, IRCER, UMR CNRS 7315, Limoges, France

9.30 *CH-5:IL02* **Mass and Heat Transport in Monolithic Ceramic Catalysts during Gas Phase Reactions for Chemical Energy Storage**
J. THÖMING, K. KUHLMANN, M. SADEGHI, C. SINN, G. PESCH, University of Bremen, Chemical Process Engineering, Bremen, Germany

10.00 *CH-5:L04* **Atomistic Simulations of Mechanical Properties of Hybrid Core-shell Ceramic Nanoparticles**
K. KAYANG, **A.N. VOLKOV**, Department of Mechanical Engineering, University of Alabama, Tuscaloosa, AL, USA

10.20 *CH-6:IL02* **Porous Ceramics - From Processing to Novel Applications**
T. FEY, FAU, Institute of Glass and Ceramics, Erlangen, Germany

SYMPOSIUM CI

PROGRESS IN ELECTROCERAMICS RESEARCH

Room: **MAGIONE A**

Chair: Masaki AZUMA, Japan

9.00 *CI-1:IL08* **The Tuning of the Ferromagetic Resonance of SrZ Hexaferrite with an External Magnetic Field**
F.E. CARVALHO[1], A.C.C. MIGLIANO[1], M.R. SILVA[2], J.C.S. AMARAL[3], **R.C. PULLAR**[3, 4], [1]Instituto de Estudos Avançados / Instituto Tecnológico da Aeronáutica, Brazil; [2]Universidade Federal de Itajubá, Brazil; [3]Dept. Eng. de Materiais e Cerâmica & Dept. Física, Universidade de Aveiro, Portugal; [4]Dipartimento di Scienze Molecolari e Nanosistemi (DSMN), Università Ca' Foscari Venezia, Venezia Mestre, Venezia, Italy

9.30 *CI-4:IL01* **Doping and Defects in Oxide Semiconductors**
A. JANOTTI, University of Delaware, Department of Materials Science and Engineering, Newark, DE, USA

10.00 *CI-4:IL03* **Development of Lithium Conducting Oxides from Crystal Chemistry to Solid-state Batteries**
E.J. CUSSEN, Department of Materials Science and Engineering, The University of Sheffield, UK

SYMPOSIUM CJ

MATERIALS DEMANDS TOWARDS NEXT GENERATION ELECTROCHEMICAL ENERGY STORAGE SYSTEMS

Room: **ORVIETO**

Chair: Mario EL KAZZI, Switzerland

9.00 *CJ-1:IL22* **In Situ Exploration of In-pore Redox Processes for Beyond Intercalation-type Energy Storage**
C. PREHAL, S. FREUNBERGER, V. WOOD, Dept of Information Technology and Electrical Engineering, ETH Zürich, Zürich, Switzerland; IST Austria (Institute of Science and Technology Austria), Klosterneuburg, Austria; Dept of Information Technology and Electrical Engineering, ETH Zürich, Zürich, Switzerland

9.30 *CJ-1:IL24* **Aqueous Electrolytes for Aluminum Ion Batteries: Investigating Ion Transport and Association Effects by Multinuclear NMR**
A. ZHENG[1,2], G. PASTEL[3], M. GARAGA[1], M. DING[3], M. SCHROEDER[3], K. XU[3], **S. GREENBAUM**[1,2], [1]Det of Physics & Astronomy, Hunter College of the City University of New York, New York, NY, USA; [2]Graduate Center of the City University of New York, New York, NY, USA; [3]U.S. Army Research Laboratory, Adelphi, MD, USA

10.00 *CJ-1:IL25* **Cross-talk Suppressing Multifunctional Electrolyte Additives for Enhanced Interfacial Stability of Ni-rich NCMs**
S. TRABESINGER, Battery Electrodes and Cells Laboratory of Electro-chemistry, Paul Scherrer Institute, Villigen PSI, Switzerland

10.30 *Break*

Chair: Steve G. GREENBAUM, USA

11.00 *CJ-1:IL26* **Prospects for Industrial Scale Vanadium Redox Flow Batteries**
M. GUARNIERI, Dept of Industrial Engineering, University of Padua, Interdepartmental Centre Giorgio Levi Cases for Energy Economics and Technology, University of Padua, Padova, Italy

11.30 *CJ-1:L27* **Operando Optical Diagnostics of Battery Chemistries**
L.J. HARDWICK, Stephenson Institute for Renewable Energy, Dept of Chemistry, University of Liverpool, UK

11.50 *CJ-1:L28* **Investigations on Double Perovskite Pr1-xBa1+xCo2O6-δ and A-site substituted Ruddlesden Popper Sm2-xSrxNiO4-δ Systems for Energy Storage Applications**
A. SHANKAR BANGWAL, M. CHAUHAN, **P. SINGH**, Indian Institute of Physics (Banaras Hindu Universities) Varanasi, Varanasi (U.P), India

12.10 *CJ-2:IL06* **Solution Processed Cu Oxide/Fe Oxide Electrode for Supercapacitor**
H.-E. LIN[1], M. UEMURA[1], Y. KATAYANAGI[2], Y. KUBOTA[1], N. MATSUSHITA[1], **R. NITTA**[1], [1]Dept of Materials Science and Engineering, Tokyo Institute of Technology, Tokyo, Japan; [2]Dept of Technology Education, Faculty of Education, Gunma University, Gunma, Japan

SYMPOSIUM CK

SOLID OXIDE FUEL CELLS: MATERIALS AND TECHNOLOGY CHALLENGES

Room: **MAGIONE B**

Chair: Massimiliano LO FARO, Italy

9.00 *CK-5:IL02* **Characterisation of Materials for Solid Oxide Cells by Means of Model-type Thin Film Samples**
A.K. OPITZ, TU Wien, Institute of Chemical Technologies and Analytics, Vienna, Austria

9.30 *CK-5:IL03* **Modelling and Characterization of Solid Oxide Cells: Impact of Microstructure and Reaction Mechanisms on Cell Performances and Degradation**
M. HUBERT, A. ABAZA, L. RORATO, G. SASSONE, L. YEFSAH, J. LAURENCIN, Univ. Grenoble Alpes – CEA/LITEN/DTCH, Grenoble, France

10.00 *CK-5:IL04* **Model Experiments for Bridging the Gap between Fundamentals and Applied SOFC Research**
A. NENNING[1], A.K. OPITZ[1], C. BISCHOF[2], M. HOLZMANN[1], M. GERSTL[1], M. DOPPLER[1], M. BRAM[2], [1]Technical University Vienna, Institute of Chemical Technologies and Analytics, Vienna, Austria; [2]Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research, Materials Synthesis and Processing (IEK-1), Jülich, Germany

10.30 *CK-5:IL05* **Computational Modeling and Simulation of Ion Transport in Oxide Electrolytes for Energy Conversion**
M. MARTIN, RWTH Aachen University, Aachen, Germany

SYMPOSIUM CL

INORGANIC MATERIALS SYSTEMS FOR ADVANCED PHOTONICS

Room: **CORCIANO**

Chair: Tindaro IOPPOLO, USA

9.00 *CL-6:IL01* **Correlating the 3D Structure of Nanoparticles with their Optical Properties**
W. ALBRECHT, T. MILAGRES DE OLIVEIRA, S. BALS, Electron Microscopy for Materials Science and NANOlab Center of Excellence, University of Antwerp, Antwerp, Belgium; P. SPAETH, S. ADHIKARI, M. ORRIT, Huygens-Kamerlingh Onnes Lab., University of Leiden, Leiden, The Netherlands; X. ZHUO, A. SÁNCHEZ-IGLESIAS, L.M. LIZ-MARZÁN, BioNanoPlasmonics Lab., CICbiomaGUNE, Donostia-San Sebastián, Spain; A. GUERRERO-MARTÍNEZ, G. GONZÁLEZ-RUBIO, Depto de Química Física, Universidad Complutense de Madrid, Madrid, Spain

9.30 *CL-6:IL02* **XPS Characterization Techniques for Novel Materials and Structures**
G. SPERANZA[1,2,3], LAM THI NGOC TRAN[2,4,5], V. MICHELI[2], A. CHIASERA[2], A. CHIAPPINI[2], M. FERRARI[2,6], [1]CMM - FBK, Trento, Italy; [2]IFN - CNR CSMFO Lab. & FBK CMM, Povo, Trento, Italy; [3]Dept of Material Engineering, University of Trento, Trento, Italy; [4]Dept of Civil, Environmental and Mechanical Engineering, University of Trento, Trento, Italy; [5]Dept of Applied Sciences, Ho Chi Minh City University of Technology and Education, Thu Duc District, Ho Chi Minh City, Vietnam; [6]Enrico Fermi Centre, Roma, Italy

10.00 *CL-6:IL04* **Unraveling the Role of Up-conversion Photonics for Enhancing Photocatalysis: Up-conversion, what else?**
J. MÉNDEZ-RAMOS[1], A. MENÉNDEZ-VELÁZQUEZ[2], P. ACOSTA-MORA[1], J. DEL-CASTILLO[1], S. TORRES-GARCÍA[1], C. HERNÁNDEZ-ÁLVAREZ[1], M. MEDINA-ALAYÓN[1], A.C. YANES[1], N.M. KHAIDUKOV[3], [1]Depto de Física, Universidad de La Laguna, La Laguna, Tenerife, Spain; [2]Centro Tecnológico IDONIAL, Parque Empresarial PEPA, Avilés, Asturias, Spain; [3]Russian Academy of Sciences, Moscow, Russian Federation

10.30 *CL-6:IL05* **Residual Stress and Refractive Index Profiles in Silicate Glasses processed by Ion Exchange**
G. MACRELLI, Isoclima SpA, R&D Department, Este, Italy

11.00 *CL-6:IL06* **Terahertz Time-domain Spectroscopy of Amorphous System**
TATSUYA MORI, University of Tsukuba, Tsukuba, Japan; Y. FUJII, Ritsumeikan University, Kusatsu, Japan; S. KITANI, Tokyo Institute of Technology, Yokohama, Japan

11.30 *Break*

Chair: Maurizio FERRARI, Italy

12.00 *CL-7:L04* **Environmental Infrared Microsensor based on Chalcogenide Materials**
V. NAZABAL[1, 3], M. BAILLIEUL[1, 2, 3], J. CHARRIER[1], C. BOUSSARD-PLEDEL[1], L. BODIOU[1], P. NEMEC[3], K. BOUKERMA[2], E. RINNERT[2], K. MICHEL[4], [1]University of Rennes 1, France; [2]IFREMER, Plouzané, France, [3]University of Pardubice, Czech Rep.; [4]BRGM, Orléans, France

12.20 *CL-7:IL08* **Metal Oxide Nanoparticles for Ultrafast Switching and Energy Applications**
F. SCOTOGNELLA, Dip. di Fisica, Politecnico di Milano, Milano, Italy

SYMPOSIUM CN

GEOPOLYMERS, INORGANIC POLYMERS AND SUSTAINABLE MATERIALS

Room: **MONTEFALCO**

Chair: Majda PAVLIN, Slovenia

9.00 *CN-3:IL08* **Corrosion of Reinforcing Steel in Alkali Activated Building Materials**
M. SERDAR, A. RUNCI, Department of Materials, Faculty of Civil Engineering, University of Zagreb, Croatia

9.30 *CN-3:IL09* **Porous Waste-based Inorganic Polymers for Innovative Applications**
R.M. NOVAIS, J. CARVALHEIRAS, J.A. LABRINCHA, Department of Materials and Ceramic Engineering / CICECO-Aveiro Institute of Materials, University of Aveiro, Campus Universitário de Santiago, Aveiro, Portugal

10.00 *CN-4:IL01* **Technical Assessment and Regulation for Alkali Activated Building Products**
V. DUCMAN, K. TRAVEN, M. PAVLIN, B, HORVAT, ZAG, Ljubljana, Slovenia

10.30 *CN-4:IL02* **New Cements for the 21st Century: The Pursuit of an Alternative to Portland Cement**
A. FERNÁNDEZ-JIMÉNEZ, I. GARCIA-LODEIRO, A. PALOMO, Eduardo Torroja Institute (Ietcc-CSIC), Madrid, Spain

11.00 *Break*

Chair: Vilma DUCMAN, Slovenia

11.30 *CN-4:L03* **Variability of Mix Design used for Pilot Production of Façade Panels: the Influence on Mechanical Properties, Microstructure and Leaching Behavior**
M. PAVLIN, B. HORVAT, V. DUCMAN, Slovenian National Building and Civil Engineering Institute, Ljubljana, Slovenia; B. MATKO, A. PAVLIN, Termit d.d., Moravče, Slovenia

11.50 *CN-4:L04* **Olive Pomace Ash as an Alternative Alkaline Activator of Electric Arc Steel Slags in the Manufacture of Alkaline Activated Cements**
D. ELICHE-QUESADA, F. ANDRES-CASTRO, M.A. GÓMEZ-CASERO, L. PÉREZ-VILLAREJO, **J.S. BUENO-RODRÍGUEZ**, Department of Chemical, Environmental, and Materials Engineering, Higher Polytechnic School of Jaén, University of Jaen, Jaén, Spain

12.10 *CN-4:IL06* **Tools of NMR to Understand Geopolymers**
I. SOBRADOS DE LA PLAZA, Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Científicas (CSIC), Madrid, Spain

12.40 *CN-4:IL07* **Laterites (natural iron-rich aluminosilicates) as Sustainable Raw Solid Precursor for Geopolymers**
E. KAMSEU[1, 2], R. KAZE[1], C. LEONELLI[2], [1]Local Materials Promotion Authory/MIPROMALO, Yaoundé, Cameroon; [2]Department of Engineering "Enzo Ferrari", University of Modena and Reggio Emilia, Modena, Italy

SYMPOSIUM CO

SCIENCE AND TECHNOLOGY FOR SILICATE CERAMICS

Room: **SPELLO**

Chair: Urska LAVRENCIC STANGAR, Slovenia

9.00 *CO-3:IL05* **The Influence of Surface Microstructure on Ceramic Tile Life Cycle Performance**
M. ENGELS, Forschungsinstitut für Anorganische Werkstoffe-Glas-Keramik-GmbH, Höhr-Grenzhausen, Germany

9.30 *CO-3:IL07* **Microstructure-oriented Porcelain Stoneware Tile Composition Design**
A. DE NONI Jr., RODRIGO RAMOS SILVA, Chemical Engineering Department, Federal University of Santa Catarina, Florianopolis, Brazil

10.00 *Break*

Chair: Michele DONDI, Italy

10.30 *CO-4:IL01* **Detailed Characterization of Amorphous and Crystalline Phases Coupled with Size-strain Analysis by Rietveld Refinement**
F. KRISTÁLY, Institute of Mineralogy and Geology, University of Miskolc, Miskolc-Egyetemváros, Hungary

11.00 *CO-4:L03* **Feasibility of using Waste Clays as Lightweight Aggregates**
T. KRONBERG, J.-E. ERIKSSON, L. HUPA, Åbo Akademi University, Turku, Finland

11.20 *CO-4:IL05* **New Parameters for Assessing Brick Resistance to Freeze-thaw Cycles**
I. NETINGER GRUBEŠA, J.J. STROSSMAYER, University of Osijek, Faculty of Civil Engineering and Architecture Osijek, Osijek, Croatia

11.50 *CO-4:IL06* **Evolution of Thermophysical Properties of Kaolin Based Clay Materials**
D.S. SMITH, Institut de Recherche sur les Céramiques (CNRS 7315), University of Limoges, Limoges, France

12.20 *CO-4:L08* **Numerical Analysis of Porcelain Tile Manufacturing by Integrated Process Simulation**
C.L. ALVES[1], A. DE NONI Jr.[2], D. HOTZA[2,4], J.B. RODRIGUES NETO[4], S.Y. GÓMEZ GONZÁLEZ[2], R. JANSSEN[3], S. HEINRICH[1], M. DOSTA[1], [1]Institute of Solids Process Engineering and Particle Technology, Hamburg University of Technology (TUHH), Hamburg, Germany; [2]Department of Chemical Engineering (EQA), Federal University of Santa Catarina (UFSC), Florianópolis, SC, Brazil; [3]Institute of Advanced Ceramics, Hamburg University of Technology (TUHH), Hamburg, Germany; [4]Graduate Program in Materials Science and Engineering (PGMAT), Federal University of Santa Catarina (UFSC), Florianópolis, SC, Brazil

SYMPOSIUM CP

REFRACTORY MATERIALS CHALLENGES TO MEET CURRENT AND FUTURE INDUSTRY NEEDS

Room: **SPELLO**

Chairs: Jinichiro NAKANO, USA / Victor C, PANDOLFELLI, Brazil

14.30 *CP-6:IL09* **The NCC Castables: Properties, Benefits and Prospects**
HONG PENG, Elkem Silicon Products Development, Kristiansand, Norway

15.00 *CP-7:IL03* **Advanced 3D Laser Profile Techniques to Inspect and Analyze Hot Refractory Linings**
R. LAMM, MINTEQ International GmbH, Duisburg, Germany

15.30 *CP-8:IL01* **Method for Determining the Thermal Expansion Coefficient of Ceramic Bodies and Glazes**
W.M. CARTY, H. LEE, M. RAMISETTY, Alfred University, Alfred, NY, USA

16.00 *CP-8:IL02* **Refractory Selection for High Temperature Plastic Gasification**
G. PATTERSON, J. NAKANO, HarbisonWalker International, Moon Township, PA, USA

16.30 *CP-8:L03* **Innovative Refractory Solutions for Lining Furnaces in Energy Intensive Industrial Sectors**
D. OLEVANO, P. MICELI, U. MARTINI, A. DI DONATO, V. RATTO, RINA Consulting Centro Sviluppo Materiali S.p.A., Rome, Italy

POSTER DISCUSSION

FRIDAY JUNE 24: 14.30 - 17.00

Posters desmounting:

(Soon after the poster discussion)

C:P01 **Silicon Powder Recovery: From End-of-Life Photovoltaic Panels to Si-SiC Composites**
S. GRILLI, E. SALERNITANO, M. SCAFÈ, F. BURGIO, P. FABBRI, G. MAGNANI, ENEA SSPT-PROMAS-TEMAF, Laboratory of Materials Technologies Faenza, Faenza (RA), Italy

C:P02 **Grain Boundary Mobility of Alumina as a Function of Varying Dopant Concentrations**
Y. SHALABI, R. MARDER, W.D. KAPLAN, Technion- Israel Institute of Technology, Iksal, Israel

C:P03 **The Influence of Anorthite Glass on Grain Boundary Mobility in Alumina**
N. FABRI[1], R. MARDER[1], R. ROVAI[2], W.D. KAPLAN[1], [1]Department of Materials Science and Engineering, Technion - Israel Institute of Technology, Haifa, Israel; [2]Industrie Bitossi S.P.A., Vinci, Italy

C:P04 **Glass Injection Moulding; Investigation of the Complete Process Chain for a Commercial Glass Powder**
M. ZÜRN, T. HANEMANN, Karlsruhe Institute of Technology, Institute for Applied Materials, Eggenstein - Leopoldshafen, Germany

C:P05 **Structurally Well-controlled Metal Nanoparticle/Ceramic Composite as Superior Catalyst for VOC Elimination**
YUNZI XIN[1], T. NAGATA[2], T. SHIRAI[1, 2], [1]Advanced Ceramics Research Center, Nagoya Institute of Technology, Nagoya, Aichi, Japan; [2]Department of Life Science and Applied Chemistry, Graduate School of Engineering, Nagoya Institute of Technology, Nagoya, Aichi, Japan

C:P06 **Laser Ablation Behavior of B4C-Cf-GNPs Hybride High-temperature Composites Sintered by Spark Plasma Sintering**
P. HVIZDOŠ, V. PUCHÝ, Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovakia

C:P07 **Cool-SPS: From Classic Ferroelectrics to Transparent Ceramics?**
F. MOLINARI, V. MARY, A. ZUDAS, C. SANZ, A. FARGUES, U-C. CHUNG, M. JOSSE, CNRS, Univ. Bordeaux, Bordeaux INP, ICMCB, UMR 5026, Pessac, France

C:P08 **Vat Photopolymerization 3D Printing of Scaffold Structures Mimetic to Bone using Prepared Bovine Hydroxyapatite**
R. ERBERELI[1], I.L. DE CAMARGO[1, 2], C.A. FORTULAN[1], [1]Department of Mechanical Engineering, School of Engineering of São Carlos, University of São Paulo, São Carlos, SP, Brazil; [2]Federal Institute of Education, Science and Technology of São Paulo, Itaquaquecetuba, SP, Brazil

C:P09 **Microwave-assisted Hydrothermal Synthesis of Doped Titanium Dioxide Quantum Dots and its Application in Photocatalysis**
M. SAGRILO FRIZZO[1], K. BETEGA[2], C.M. POFFO[1], D. HOTZA[1, 2], **J.B. RODRIGUES NETO**[1], [1]Graduate Program in Materials Science and Engineering (PGMAT), Federal University of Santa Catarina (UFSC); [2]Department of Chemical Engineering (EQA), Laboratory of Processing of Ceramics (PROCER), Federal University of Santa Catarina (UFSC), Florianopolis, Brazil

C:P10 **Multi-nozzle Spray Synthesis of Inorganic Nanoparticles: Early Stage of a New Process**
G. GALLAND, M. COMET, D. SPITZER, NS3E - CNRS, Saint-Louis, France

C:P11 **Plasma Firing of Ceramics**
D.R. WING, D.R. BOUGHTON, S. KRAMEL, J.H. CITRINITI, L.A. CONGDON, Corning Research and Development Corporation, Corning, USA

C:P12 **Simulation of Heat Transfer on In-Situ Derived Alumina-TiB2 Composites**
E. DASKALAKIS, A. JHA, A. SCOTT, A. HASSANPOUR, School of Chemical and Process Engineering, University of Leeds, Leeds, UK

C:P13 **Kinetic Studies of High Entropy FeNiAlCo and FeNiAlCoCr Alloys Formation at High Heating Rates**
Kh. NAZARETYAN, M. TUMANYAN, A.B. Nalbandyan Institute of Chemical Physics, Yerevan, Armenia; D. MOSKOVSKIKH, A. NEPAPUSHEV, National University of Science and Technology MISIS; S. AYDINYAN, A.B. Nalbandyan Institute of Chemical Physics, Yerevan, Armenia and Tallinn University of Technology, Tallinn, Estonia; S. KHARATYAN, A.B. Nalbandyan Institute of Chemical Physics, Yerevan, Armenia

C:P14 **Formation of Ti2AlNx Max-phase by "Hydride Cycle" and SHS Methods**
A.G. ALEKSANYAN, S.K. DOLUKHANYAN, D.G. MAYILYAN, G.N. MURADYAN, O.P. TER-GALSTYAN, N.L. MNATSAKANYAN, A.B. Nalbandyan Institute of Chemical Physics of NAS of Armenia, Yerevan, Armenia

C:P15 **Self-propagating High-temperature Synthesis of MAX-phases in Ti-Zr-Al-C System**
N.N. AGHAJANYAN, S.K. DOLUKHANYAN, O.P. TER-GALSTYAN, G.N. MURADYAN, K.V. ASATRYAN, A.B. Nalbandyan Institute of chemical Physics of Armenian National Academy of Sciences (IchPhNAS RA), yerevan, Armenia

C:P16 **Synthesis of Nanoscale Antiperovskite Complex Nitrides for Catalytic and Magnetic Applications**
N.H. AMIRKHANYAN, M.K. ZAKARYAN, A.B. HARUTYUNYAN, A.B. Nalbandyan Institute of Chemical Physics, Yerevan, Armenia

C:P17 **Pressure-less Glass-ceramic Joining of SiC/SiC Nuclear Fuel Clads for Light Water Reactors**
S. DE LA PIERRE[1], M. HERRMANN[2], M. FERRARIS[1], [1]Department of Applied Science and Technology (DISAT), Politecnico di Torino, Italy; [2]Institute of Power engineering, Technische Universität Dresden, Germany.

C:P18 **Influence of the Sintering Parameters on Microstructure Development and Mechanical Properties of (Mo-Nb-Ta-V-W)C based High-entropy Carbides**
R. SEDLAK, A. KOVALČÍKOVÁ, T. CSANÁDI, J. DUSZA, Institute of Materials Research, Slovak Academy of Sciences, Division of Ceramic and Non-Metallic Systems, Košice, Slovak Republic; H. ÜNSAL, P. TATARKO, M. TATARKOVÁ, P. ŠAJGALÍK, Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava, Slovak Republic

C:P19 **Improvement of the Mechanical Properties of TiB2 for Armour Applications using Different Additives and Sintering Techniques**
S. TARABORELLI, S. FAILLA, D. SCITI, CNR Faenza, Italy

C:P20 **Nanoindentation of Dual-phase High-entropy Ultrahigh Temperature Ceramics**
A. NAUGHTON DUSZOVA[1], L. TIMKOVÁ[1], T. CSANÁDI[1], M. VOJTKO[1], P. TATARKO[2], V. KOMBAMUTHU[3], H. ÜNSAL[2], M. TATARKOVÁ[2], P. HVIZDOŠ[1], [1]The Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovakia; [2]Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava, Slovakia; [3]CEMEA - Center of Excellence for Advanced Materials Applications, Slovak Academy of Sciences, Bratislava, Slovakia

C:P21 **Towards Increasing the Yield and Enhancing the Quality of In-plane Vacancy Ordered MXenes (Mo1.33CTz and W1.33CTz¬) Obtained from their In-plane Ordered i-MAX Phases (Mo2/3Y1/3)2AlC and (W2/3Y1/3)2AlC**
J. HALIM, J. ROSEN, Material Design Division, Department of Physics, Chemistry and Biology (IFM), Linköping, Linköping University, Linköping, Sweden

C:P22 **Sol-gel Assisted Synthesis of New Carbonitride MAX Phases V2GaC1-xNx and Cr2GaC1-xNx**
N. KUBITZA, Technische Universität Darmstadt, Darmstadt, Germany; C.S. BIRKEL, Arizona State University, Tempe, AZ, USA

C:P23 **Inherently Nanolaminated $Mn_5Ge_3C_{0.5}$ Epitaxial Films: A New Superstructure Inferred from the ^{55}Mn NMR Study**
E. JEDRIKA[1], M. WÓJCIK[1], R. KALVIG[1], M. PETIT[2], L.MICHEZ[2], [1]Institute of Physics, Polish Academy of Sciences, Warsaw, Poland; [2]Aix Marseille Univ, CNRS, CINAM, Marseille, France

C:P24 **Transport and Mechanical Properties of Copper-MAX-phases Composites Obtained by Spark Plasma Sintering**
J.-P. ERAUW, V. DUPONT, C. GAJDOWSKI, Belgian Ceramic Research Centre (BCRC), Mons, Belgium

C:P25 **Low-temperature Plasma Treatment in Designing the Morphology of Titania Nanofibers**
I. SHEPA, E. MUDRA, M. VOJTKO, O. MILKOVIC, J. DUSZA, Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic; D. PAVLINAK, Department of Physical Electronics, Masaryk University, Brno, Czechi Republic; P. TATARKO, Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava, Slovak Republic; V. ANTAL, J. BEDNARCIK, Institute of Experimental Physics, Slovak Academy of Sciences, Košice, Slovak Republic

C:P26 **Synthesis of Nanostructured Tungsten-doped Niobate-Perovskites via Ultrasonic Spray Pyrolysis**
S. LANFREDI[1], F.R. PRAXEDES[2], J. MATOS[3], M.A.L. NOBRE[1], [1]São Paulo State University (Unesp), School of Technology and Sciences, Presidente Prudente, SP, Brazil; [2]São Paulo State; University (Unesp), Institute of Biosciences, Humanities and Exact Sciences, São José do Rio Preto, SP, Brazil; [3]Instituto de Ciencias Químicas Aplicadas, Facultad de Ingeniería, Universidad Autónoma de Chile, Santiago, Chile

C:P27 **Silicon Carbide Thin Films Deposited by HiPIMS on Ti-6Al-4V Substrates to Improve the Adherence for Tribological Applications**
A.C. MERIJ[1], K.G.GRIGOROV[2], G.F.C.ALMEIDA[3], A.A.COUTO[3, 4], A.A. ARBEX[3], A.S. DA SILVA SOBRINHO[5], D.M.G. LEITE[5], C.A.M.OLIVEIRA[3], **M. MASSI**[3], [1]Federal University of São Paulo, ICT/UNIFESP, São José dos Campos / SP, Brazil; [2]Space Research and Technology Institute, Acad. G. Bonchev, Bl.1, Sofia, Sofia, Bulgaria; [3]Mackenzie Presbyterian University, School of Engineering-PPGEMN, São Paulo / SP, Brazil; [4]Nuclear and Energy Research Institute, IPEN/USP, São Paulo / SP, Brazil; [5]Technological Institute of Aeronautics, ITA/DCTA, São José dos Campos / SP, Brazil

C:P28 **Photonic Multilayer Structure for Near-infrared Blocking as Energy-saving Window**
JIWON KIM[1], **SANGWON BAEK**[1], JAE YONG PARK[1], KWANG HO KIM[2], JONG-LAM LEE[1], [1]Department of Materials Science and Engineering, Pohang University of Science and Technology, Pohang, South Korea; [2]Department of Materials Science and Engineering, Pusan National University, Pusan, South Korea

C:P29 **Insulator-conductor Transition of Plasma Sprayed Alumina (Al2O3) Coating upon Reinforcement of Carbonaceous Nanofillers**
D.K. PANDEY, A.K. KESHRI, Indian Institute of Technology Patna, Bihar, Patna, India

C:P30 **Studies on Structure, Redox Properties and Catalytic Activity of Cu-doped Strontium Titanates obtained from Modified Pechini Method**
A. MIZERA, E. DROZDZ, AGH University of Science and Technology, Kraków, Lesser Poland, Poland

C:P31 **The Influence of Humidity on Perovskite Niobate Dielectrics**
M. FREY[1], C.K. YANG[1], T. HANEMANN[1,2], [1]University of Freiburg, Department of Microsystems Engineering - Laboratory for Materials Processing, Freiburg, Germany; [2]Karlsruhe Institute of Technology, Institute of Applied Materials, Karlsruhe, Germany

C:P32 **Nanomechanical Probing of Lead-free Ferroelectrics**
K. ZIBERNA[1, 2], A. DRNOVŠEK[3], H. URŠIČ[1, 2], T. ROJAC[1, 2], A. BENČAN[1, 2], [1]Electronic Ceramics Department, Jožef Stefan Institute, Ljubljana, Slovenia; [2]Jožef Stefan International Postgraduate School, Ljubljana, Slovenia; [3]Department of Thin Films and Surfaces, Jožef Stefan Institute, Ljubljana, Slovenia

C:P33 **Carbon Encapsulated Core-shell Nickel@nickel Sulfide as High-capacity Battery-type Cathode for High-capacity Hybrid Supercapacitors**
M.R. PALLAVOLU, R.R. NALLAPUREDDY, **SANG W. JOO**, School of Mechanical Engineering, Yeungnam University, Gyeongsan 38541, Republic of Korea

C:P34 **Understanding Electrolyte Influence on Lithium Plating via Potential-driven Deposition**
E. WINTER[1], T.J. SCHMIDT[2], S. TRABESINGER[1], [1]Electrochemistry Laboratory, Paul Scherrer Institut, Switzerland; [2]Energy and Environment Research Division, Paul Scherrer Institut, Switzerland / Laboratory of Physical Chemistry, ETH Zürich, Switzerland

C:P35 **Efficient Synthesis of High-sulfur-content Cathodes for High-performance Li-S Batteries based on Solvothermal Polysulfide Chemistry**
YU-TING WENG, NAE-LIH WU, Advanced Research Center for Green Materials Science and Technology, National Taiwan University, Taipei, Taiwan

C:P36 **Ru/La0.75Sr0.25Cr0.5Mn0.5O3-δ Catalysts for Syngas Synthesis in IT-SOFCs**
J. ISOPI, S. FASOLIN, S. BARISON, CNR, Padova, Italy

C:P37 **Anti-counterfeiting Security Inks using Colour Tuneable Rare-earth doped Sol-gel Nano-glass-ceramics for Codification of Luminescent Patterns**
C. HERNÁNDEZ-ÁLVAREZ, S. TORRES-GARCÍA, M. MEDINA-ALAYÓN, P. ACOSTA-MORA, A.C. YANES, J. DEL-CASTILLO, Universidad de La Laguna, La Laguna, Tenerife, Spain; A. MENÉNDEZ-VELÁZQUEZ, Centro IDONIAL, Oviedo, Asturias, Spain; J. MÉNDEZ-RAMOS, Universidad de La Laguna, La Laguna, Tenerife, Spain

C:P38 **Influence of the Presence of Iron in the Form of Fe3O4 on the Manufacture of Lightweight Aggregates**
T. COTES PALOMINO[1], C.J. COBO-CEACERO[1], B. GONZÁLEZ-CORROCHANO[1], A.B. LÓPEZ-GARCÍA[1], J.M. MORENO-MAROTO[1], A. CONDE-SÁNCHEZ[2], A.M. MARTÍNEZ-RODRÍGUEZ[2], M. UCEDA-RODRÍGUEZ[1], J. ALONSO-AZCÁRATE[3], C. MARTÍNEZ-GARCÍA[1], [1]Department of Chemical, Environmental and Materials Engineering. Higher Polytechnic School of Linares, University of Jaén. Linares (Jaén), Spain; [2]Department of Statistics and Operational Research. Campus Las Lagunillas. University of Jaén, Jaén, Spain; [3]Department of Physical Chemistry. Faculty of Environmental Sciences and Biochemistry. University of Castilla-La Mancha, Avenida Carlos III, Toledo, Spain

C:P39 **The Drava River Sediments as Precursors in the Production of Alkali Activated Materials (AAMs)**
K. TRAVEN, B. HORVAT, Slovenian National Building and Civil Engineering Institute, Ljubljana, Slovenia; **M. BOŽIČ**, B. GREGORC, Dravske elektrarne Maribor, Maribor, Slovenia; V. DUCMAN, Slovenian National Building and Civil Engineering Institute, Ljubljana, Slovenia

C:P40 **Alkali-activation of Fly-ash with Microwaves**
B. HORVAT, M. PAVLIN, V. DUCMAN, ZAG, Ljubljana, Slovenia

C:P41 **Reuse of Waste Glass Wool generated in the Process of Demolition and Restoration of Buildings for the Production of Artificial Lightweight Aggregates**
J.M MORENO-MAROTO, A.B LÓPEZ GARCÍA, S. LEÓN-GUTIERREZ, M.T. COTES-PALOMINO, C. COBO-CEACERO, M. UCEDA-RODRÍGUEZ, **C. MARTÍNEZ-GARCÍA**, Department of Chemical, Environmental and Materials Engineering, Higher Polytechnic School of Linares, University of Jaén, Linares (Jaén), Spain

C:P42 **LCA of W2L Pilot Façade Panels from Alkali-activated Stone Wool**
A. LESEK[1], M. PAVLIN[1], B. HORVAT[1], K. MALOVRH REBEC[1], F. KNEZ[1], V. DUCMAN[1], B. MATKO[2], M. ŽAJDELA[2], E. SEVER[2], A. PAVLIN[2], A. KAISER[3], [1]Slovenian National Building and Civil Engineering Institute, Ljubljana, Slovenia; [2]TERMIT, Moravče, Slovenia; [3]Saint-Gobain Finland Oy, Helsinki, Finland

C:P43 **Use of Biomass Fly Ash as Filler in a Commercial Screed Mortar Formulation**
M.N. CAPELA[1], I.S. VILARINHO[1], I.R. VIEIRA[1], L.A. TARELHO[2], **P. SEABRA**[1], J.A. LABRINCHA[1], [1]CICECO - Aveiro Institute of Materials, Department of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal; [2]CESAM - Centre for Environmental and Marine Studies, Department of Environment and Planning, University of Aveiro, Aveiro, Portugal

C:P44 **Incorporation of Bioleached Sulfidic Mine Tailings in One-part Alkali-activated Blast Furnace Slag Mortar**
HE NIU, P. KINNUNEN, M. ILLIKAINEN, Fibre and Particle Engineering Research Unit, University of Oulu, Oulu, Finland; I.J. CORFE, J. KUVA, A.R. BUTCHER, Geological Survey of Finland

C:P45 **Lightweight Mortars Prepared from Synthetic Glass Aggregates Formulated from Waste**
M. ROMERO, I. PADILLA, J.L. GARCÍA CALVO, P. CARBALLOSA, F. PEDROSA, A. LÓPEZ-DELGADO, Eduardo Torroja Institute of Construction Science, IETcc-CSIC, Madrid, Spain

C:P46 **Valorization of Almond and Hazelnut Shell Residues as a Potential Resource in the Manufacture of Ceramic Bricks**
A.B. LÓPEZ-GARCÍA, T. COTES-PALOMINO, J.L. GARCÍA RODRÍGUEZ, C. LERMA VILLAR, M. MÁRQUEZ FERNÁNDEZ, A. RENTERO LÓPEZ, C. MARTÍNEZ-GARCÍA, Department of Chemical, Environmental and Materials Engineering, Scientific-Technological Campus of Linares, University of Jaén, Linares (Jaén), Spain

C:P47 **Characterization of YBa2Cu3O7 Films Grown on SrTiO3 and YSZ Substrates by Chemical Solution Deposition of Trifluoroacetates**
A. BUSTAMANTE, A.M. OSORIO, J. FLORES, H. SÁNCHEZ, L. SÁNCHEZ, Universidad Nacional Mayor de San Marcos, Lima, Perú; L. DE LOS SANTOS, D.A. RITCHIE, C.H.W. BARNES, University of Cambridge, Cambridge, UK

C:P48 **Systematic High-throughput Screening for Magnetic MAX Phases**
A.M. MALIK, J. ROHRER, K. ALBE, Technical University of Darmstadt, Darmstadt, Germany

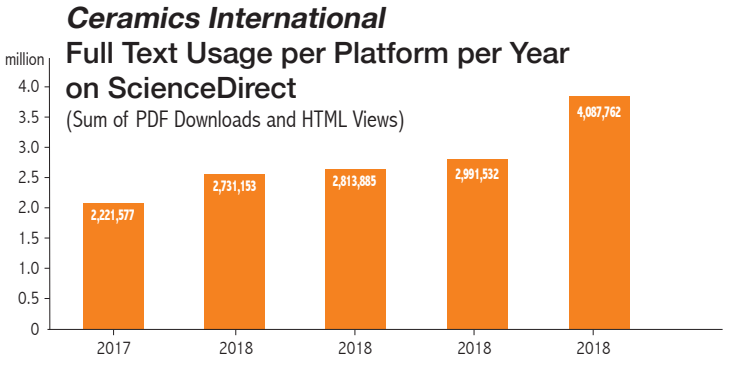
Publication Policy

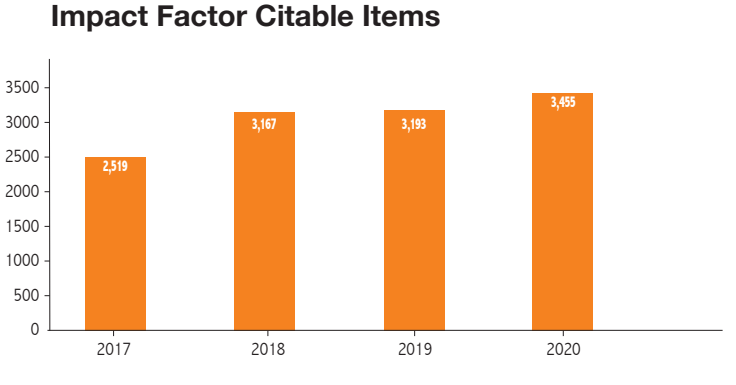
Authors at CIMTEC 2022 may submit their papers for publication in a special issue of Elsevier-TechnaGroup journal "Ceramics International"
https://www.journals.elsevier.com/ceramics-international

A window for papers submission will be opened at journal website as from July 1 to August 31. We regret that late submissions cannot be considered.

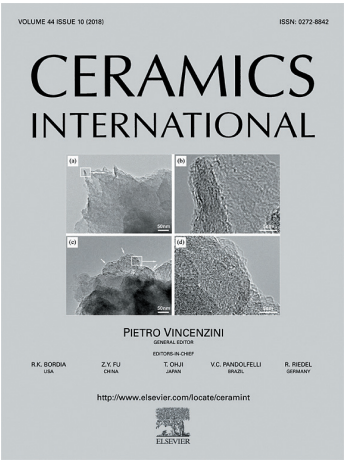
SUBMISSION INFORMATION

1. Only papers presented at CIMTEC 2022 by Authors regularly registered to the conference (Congress and/or Forum) may be submitted choosing the Article Type Name "SI: CIMTEC 2022".
2. The Corresponding Author for the submitted paper shall be the one registered at the Conference as Presenting Author for the paper.
3. The Code Number assigned to the paper shall be mandatorily reported at the end of the title of the submitted paper.
   Example: Iron Boride Coatings for Wear and Corrosion Resistance Applications (CH-5:IL02).
   If the Code Number is not indicated, the paper will not be recognized as a CIMTEC 2022 contribution with the risk to be rejected without peer review.
4. All papers will be subjected to the standard peer review process.
5. Deadline for submission of the final approved paper is December 31, 2022.





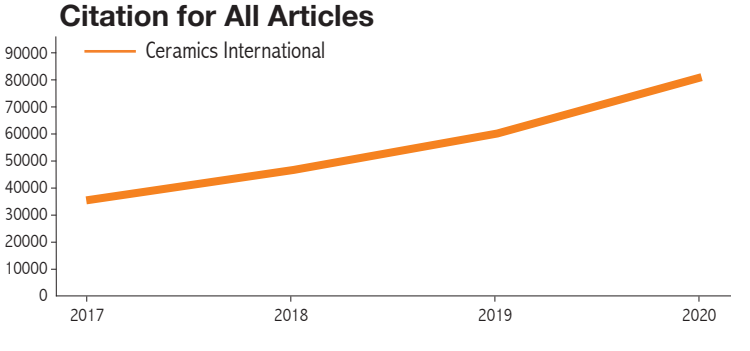
Ceramics International



Ceramics International is particularly keen to attract papers which deal with fundamental scientific aspects that are relevant to the development of the whole range of advanced ceramics including e.g. phase equilibria and transformations, reactivity, transport processes, thermodynamic and electronic properties, as well as quantum effects in low dimensional materials. The journal encourages contributions that demonstrate how an understanding of the basic chemical and physical phenomena may direct materials design and stimulate ideas for new or improved processing techniques, in order to obtain materials with desired structural features and properties.

Ceramics International covers oxide and non-oxide ceramics, functional glasses, glass ceramics, amorphous inorganic non-metallic materials (and their combinations with metal and organic materials), in the form of particulates, dense or porous bodies, thin/thick films and laminated, graded and composite structures. Technologically relevant low-dimensional systems are a particular focus of Ceramics International . These include 0, 1 and 2-D nanomaterials (also covering CNTs, graphene and related materials, and diamond-like carbons), their nanocomposites, as well as nano-hybrids and hierarchical multifunctional nanostructures that might integrate molecular, biological and electronic components.

Process related topics such as ceramic-ceramic joints or joining ceramics with dissimilar materials, as well as surface finishing and conditioning are also covered. Besides traditional processing techniques, manufacturing routes of interest include innovative procedures benefiting from externally applied stresses, electromagnetic fields and energetic beams, as well as top-down and self-assembly nanotechnology approaches. In addition, the journal welcomes submissions on bio-inspired and bio-enabled materials designs, experimentally validated multi scale modelling and simulation for materials design, and the use of the most advanced chemical and physical characterization techniques of structure, properties and behaviour.



Social Programme

Welcome Party
Chiostro di Santa Giuliana

Tuesday June 21
20.30 - 22.00

The Welcome Party will take place at the St' Giuliana Cloister (Chiostro di Santa Giuliana). The Cloister is part of the monumental complex of St' Giuliana erected around the year 1253 and now the seat of the School for Foreign Languages of the Italian Army. The splendid cloister by architect Matteo Gattapone constitutes one of highest examples of "circestence" architecture in Italy and is characterized by wide white arches supported by octagonal pillars with pink and white stripes, also including some capitals remnants of previous Roman building.

Entrance ticket for companions: 35.00 EUR

Conference Dinner

Tenuta San Lorenzo Vecchio

Friday June 24

20.30 - 23.00

The Conference Dinner will take place at "Tenuta San Lorenzo Vecchio", a 17th century village surrounded by vineyards and olive groves, located on a hill between Foligno and Spello, on the slopes of Mount Subasio, at 400/600 m.

Entrance ticket for companions: 65.00 EUR

Optional Tours

PASSIGNANO & TRASIMENO LAKE

Tuesday June 21, afternoon
15.00 - 19.00

Passignano sul Trasimeno (Passignano on Trasimeno Lake) is placed on the lakeshores. The town was built in between the 16th and the 17th Century whereas its suggestive historical centre surrounding the fortress dates back to medieval and also to most ancient times. After a view of the historical centre, participants will take a ferry to visit Isola Maggiore, the biggest island of Lake Trasimeno.

The lake is south of the river Po and north of the nearby river Tiber. Only two minor streams flow directly into the Lake and none flows out. The water level of the lake fluctuates significantly according to rainfall levels and the seasonal demands from the towns, villages and farms near the shore. The first civilization to inhabit this area was the Etruscans; three of the main Etruscan cities - Perugia, Chiusi, and Cortona - are within 20 kilometres (12 miles) of the lake. Little physical evidence remains from the period of Etruscan or later Roman settlement. Castiglione del Lago, has some Roman ruins and its main streets are structured like a chessboard in the Roman style. The lake includes three islands: Isola Maggiore, Isola Polvese and Isola Minore.

Meeting point: Centro Congressi Quattrotorri at 14.30. Return to Perugia at about 19.00.
The participation fee (40.00 EUR) includes bus transfer, English speaking hostess and local guides, served lunch and ferry ticket.

SPOLETO & MONTEFALCO

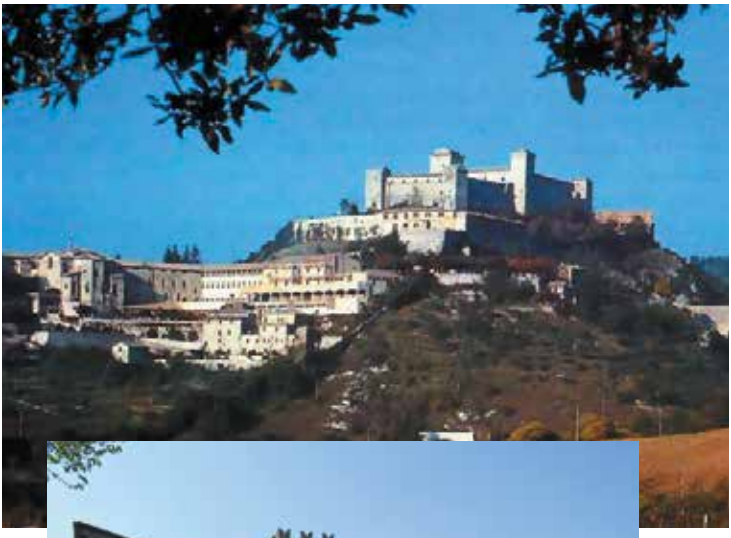
Wednesday June 22, full day
9.30 - 19.00

Spoleto, (Latin Spoletium) is an ancient city in the Perugia district located at the head of a large, broad valley, surrounded by mountains. The town has long occupied a strategic geographical position. It appears to have been an important town to the original Umbri tribes, who built walls around their settlement in the 5th century BC, some of which are visible today. An ancient Roman colony, after Ostrogoth

and Lombard, medieval town contended between the Pope and the Emperor, between Guelfs and Ghibellines, cultural centre during the Renaissance and Bishop seat, the history of the City has left an exceptional architectonic and art cultural heritage within a splendid naturalistic context. The Acquedotto delle Torri (Towers Aqueduct) with its majesty and beauty welcomes us when joining Spoleto.
The tour includes:
- Town walls, "Torre dell'Olio" (Oil Tower) and Porta Fuga (Fuga Door)
- Roman Theatre
- Domus of Flavia Vespasia Pollia Domus, mother of Roman Emperor Vespasiano
- Arco di Druso (Arch of Drusus)
- Roman church of Sant'Eufemia
- Cathedral square
- Ponte delle torri (Tower Bridge) connecting the historical centre. The bridge, built in between the 12th and 13th Century, is 280 meters long and 82 meters high.

Lunch: Restaurant in Spoleto

Montefalco, a charming tow built on a hill overlooking the valley linking Perugia with Spoleto, has been settled since the times of the Umbri. It has been under the successive domination of the Romans, Lombards, being called Coccorone in the Middle Ages. In 1249 it



was sacked by Frederick II, but was soon rebuilt with the modern name. From the 13th century it had been a free comune under the domination of local nobles and merchants, but later, as with many other Umbrian locales, the comune gave way to government by a signoria (1383-1439). In 1446 it fell under the rule of the Papal States where it remained until the unification of Italy in 1861. Montefalco has several churches, some in the Romanesque, some in the Gothic and some in the Renaissance style. The 13th century Palazzo Comunale ("Town Hall") has a mullioned window from the original edifice and a 15th-century portal. Also notable are the gates in the walls, including Porta Sant'Agostino, Porta Camiano and Porta Federico II.

The tour includes:

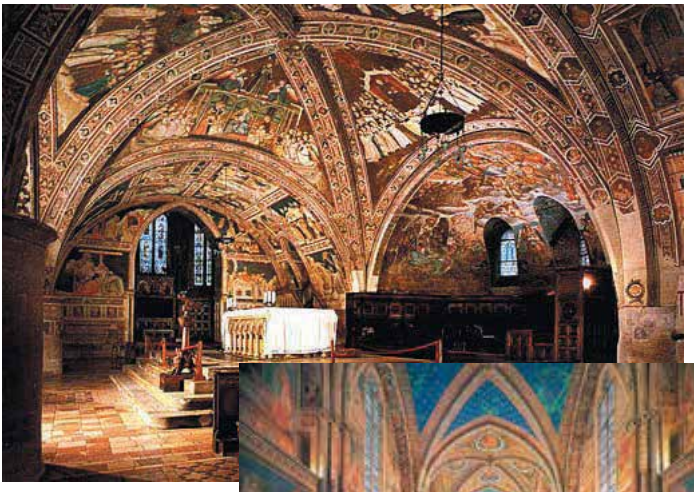
- Saint Francis Church
- Architectural lodges
- Main Square
- Consuls Palace and Palace of the Podestà
- Cathedral
- Ducal Palace
- Medieval street sand panoramic views

Meeting point: Centro Congressi Quattrotorri at 9.00. Return to Perugia at about 19.00.
The participation fee (75.00 EUR) includes bus transfer, English speaking hostess and local guides, and served lunch.

ASSISI & SPELLO

Thursday June 23, full day
9.30 - 19.00

Placed on the slope of Subasio Mountain (Monte Subasio), Assisi (https://en.wikipedia.org/wiki/Assisi) is without any doubt the most internationally renowned city from Umbria Region its fame mainly deriving from being the birth place of San Francis (San Francesco) the patron saint of Italy. UNESCO collectively designated the Franciscan structures of Assisi as a World Heritage Site in 2000. The city retains vestiges of the Roman age whereas the Middle Ages urban planning remains practically untouched.



The Basilica of San Francesco d'Assisi (St. Francis) is the major sight in Assisi. The Franciscan monastery, il Sacro Convento, and the lower and upper church (Italian: Basilica inferiore and Basilica superiore) of St Francis were begun in 1228, and completed in 1253. The lower church has frescoes by the late-medieval artists Cimabue and Giotto; the upper church houses frescoes of scenes in the life of St. Francis previously ascribed to Giotto, but now thought to be by artists of the circle of Pietro Cavallini from Rome.
The visit includes:
- Basilica di San Francesco (St. Francis Church)
- Piazza del Comune (Town Hall square)
- Tempio della Minerva (Minerva Temple)
- Chiesa Nuova (New Church built over the presumed parental home of St. Francis)
- Oratorio di San Francesco piccolino (Oratory of St. Francis)
- Basilica di Santa Chiara (Basilica of St. Clare)

Lunch: Restaurant in Assisi

Spello (in Antiquity: Hispellum) (https://en.wikipedia.org/wiki/Spello) is an ancient town placed on the lower southern flank of Mt. Subasio, about 6 km from Assisi. The old walled town lies on a regularly NW-SE sloping ridge that eventually meets the plain. From the top of the ridge, Spello commands a good view of the Umbrian plain towards Perugia; at the bottom of the ridge, the town spills out of its walls into a small modern section (or Borgo).
Spello remains four monumental gates and a long track of walls of Roman Age, besides the ruins of Roman amphitheatre and holy buildings. The Middle Ages town is one of the more fascinating of the Umbria Region.

The visit includes:
- Porta Urbica (Urbica Gate)
- Mura Romane (Roman Walls)
- Porta Consolare (Consular Gate)
- Chiesa Collegiata di Santa Maria Maggiore (Santa Maria Maggiore Church with Pinturicchio frescoes)
- Palazzo Comunale (Medioeval Tawn Hall)
- Palazzo Cruciali (Cruciali Palace)
- Belvedere (panoramic viewpoint)
- Porta Venere con Torri di Propezio (Venere Gate and Propezio Towers)

Meeting point: Centro Congressi Quattrotorri at 9.00. Return to Perugia at about 19.00.
The participation fee (80.00 EUR) includes transportation, city entrance taxes, English speaking hostess and local guides, headphone & earphones for basilica, and lunch.

GUBBIO

Friday June 24, morning
9.30 - 13.00

Gubbio (https://en.wikipedia.org/wiki/Gubbio), located on the lowest slope of Mt. Ingino, a small mountain of the Apennines, is among the best preserved splendid Middle Ages city of Umbria Region. The city's origins are very ancient. The hills above the town were already occupied in the Bronze Age, followed by Umbrian people and Roman conquest in the 2nd century BC. Gubbio became very powerful in the beginning of the Middle Ages and became part of the Papal States in 1631. The historical centre of Gubbio has a decidedly medieval aspect: the town is austere in appearance because of the dark grey stone, narrow streets, and Gothic architecture. Many houses in central Gubbio date to the 14th and 15th centuries, and were originally the dwellings of wealthy merchants.
Among most important buildings and sites in the city are: Roman Theater and Roman Mausoleum, Palazzo dei Consoli, Duomo, Palazzo Ducale and several others.

The visit includes:

- Chiesa di San Francesco (St. Francis Church)
- Logge (Open galleries)
- Piazza Grande (Main Square)
- Palazzo dei Consoli e Palazzo del Podestà (Middle Ages public palaces)
- Cattedrale (Cathedral)
- Palazzo Ducale (Dukes Palace)
- Middle Ages alleys and panoramic views

Meeting point: Centro Congressi Quattrotorri at 9.00. Return to Perugia at about 13.00.
The participation fee (35.00 EUR) inludes transportation, city taxes, English speaking hostess and local guide.

Conference Hotels

1. Best Western Hotel Quattrotorri
   CONGRESS CENTER
2. Chocohotel
3. Sangallo
4. Brufani
5. Fortuna
6. Giò Wine & Jazz

9. Chiostro S. Giuliana
(Welcome Reception)

10. Central Railway Station

11. Ellera Railway Station

12. Piazza Partigiani
Bus Transfer to/from Congress Center

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