

INFUB-13 CONFERENCE PROGRAMME

Last update: 14/4/2022

▪ TUESDAY: 19TH APRIL

15:00 – 18:00 **REGISTRATION**

18:00 – 19:30 **OPENING SESSION (Room: Pacific)**

WELCOME ADDRESS

INFUB Organizing Committee

Viktor Scherer (Ruhr-Universität Bochum, Germany), Neil Fricker (University of South Wales, United Kingdom), Albino Reis (Cenertec – Centro de Energia e Tecnologia, Portugal)

KEYNOTE LECTURE

The Energy Policy in the European Union

Maria da Graça Carvalho

Member of the European Parliament, Portugal

20:00 **WELCOME DINNER at the Hotel NAU São Rafael Atlântico**

▪ WEDNESDAY: 20TH APRIL

08:30 – 09:20 **KEYNOTE LECTURE II**
Will hydrogen be the new climate-neutral natural gas?

Gerald Linke

Deutscher Verein des Gas- und Wasserfaches (DVGW), Germany

09:25 – 10:45 **PARALLEL SESSION I**

S1: Combustion & Heat Transfer Chair: Viktor Scherer Room: Pacific	S2: Pollutants Chair: Joachim Wüning Room: Indian
<p>A CAMERA-BASED FLAME STABILITY CONTROLLER FOR NON-OSCILLATING AND OSCILLATING COMBUSTION Jörg Matthes; Patrick Waibel; Markus Vogelbacher; Hubert Keller; Hans-Joachim Gehrman; Dieter Stapf Karlsruhe Institute of Technology (KIT, Germany); Competence Center Vision Systems, Kistler Group (UK)</p>	<p>NOX REDUCTION POTENTIAL BY N2 DILUTION FOR A SWIRLED-STABILIZED METAL-AIR BURNER Adeline Andrieu, Olivier Allgaier, Gontrand Leyssens, Cornelius Schönnenbeck, Jean-François Brilhac LGRE/Université de Haute-Alsace, France</p>
<p>EXPERIMENTAL AND COMPUTATIONAL INVESTIGATIONS ON COMBUSTION OF POWDERED BIOMASS FUELS IN MILD CONDITIONS Mani Kalyani Ambatipudi; Saravanan Sujith Kaarthik; Abbhijith Hari Gopal; Arun Appadurai; Varunkumar S</p>	<p>FEED STUDY FOR THE DESIGN OF A 50000TPA PRODUCTION PLANT TO PRODUCE LIME WITH ZERO CO2 EMISSIONS TO ATMOSPHERE Barrie Jenkins; Tim Kruger; Christine Bertrand Origen Power Ltd (United Kingdom)</p>

<p>Indian Institute of Technology, Madras, Chennai, India; FLSmith Private Limited, Chennai, India</p> <p>INFLUENCE OF LOAD-FLEXIBLE OPERATION ON HEATING SURFACE FOULING IN A GERMAN LIGNITE-FIRED POWER PLANT Christoph Bergmann; Marie Kaiser; Jonas Meitz; Daniel Bernhardt; Michael Beckmann Chair of Energy Process Engineering, TU Dresden; CheMin GmbH; RWE Power AG, Germany</p> <p>A FAST THERMAL NON-EQUILIBRIUM EULERIAN-EULERIAN NUMERICAL SIMULATION METHODOLOGY OF A PULVERIZED FUEL COMBUSTOR Ryno Laubscher; Pieter Rousseau; Brad Rawlins University of Cape Town (South Africa)</p>	<p>DESIGN AND TESTING OF A MULTI-FUEL INDUSTRIAL BURNER SUITABLE FOR SYNGASES, FLARE GAS AND PURE HYDROGEN Gianluca Rossiello; Lorenzo Morandi; Diego Maggiolini; Marzio Ferrara; Marco Torres; Seyed Behzad Ahmadpanah; Giuseppe Blasi; Giuseppe Molfetta; Gabriele Domenico Rago; Alessandro Saponaro Itea SpA, ITALY; Macchi, ITALY; Department of Mechanics, Mathematics and Management, Polytechnic University of Bari, ITALY; Centro Combustione Ambiente SpA, ITALY</p> <p>EXPERIMENTAL INVESTIGATIONS ON THE DEVELOPMENT OF HYDROGEN/NATURAL-GASFIRED SELF-RECUPERATIVE BURNERS FOR LOWEST NOX-EMISSIONS Lukas Sankowski; Nico Schmitz; Herbert Pfeifer Department for Industrial Furnaces and Heat Engineering, RWTH Aachen University, Germany</p>
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10:45 – 11:15

COFFEE – BREAK

11:15 – 12:35

PARALLEL SESSION II

S3: Monitoring Chair: Martin Seemann Room: Pacific	S4: Modelling Chair: Pedro Coelho Room: Indian
<p>INCREASING FUEL FLEXIBILITY OF BIOMASS BOILERS AND PLANTS WITH NEW SENSOR MODULES Meiller Martin Fraunhofer UMSICHT, Germany</p> <p>CHARACTERISATION OF THE CALORIFIC-VALUE GAS WITH FLUCTUATING COMPOSITION COMBUSTION PROCESS OF LOW- Marius Philipp; Nico Schmitz; Herbert Pfeifer Department for Industrial Furnaces and Heat Engineering, RWTH Aachen University, Germany</p>	<p>TRANSIENT CFD SIMULATIONS OF THE IRONMAKING BLAST FURNACE: IMPACT OF CARBON DISSOLUTION AND ENERGY TRANSPORT ON THE FLOW IN THE HEARTH Henry Merten; Siegmar Wirtz; Viktor Scherer; Hauke Bartusch; Yalcin Kaymak; Stephan Hojda; Rongshan Lin Ruhr-University Bochum, Germany; VDEh-Betriebsforschungsinstitut, Department Process Optimisation Iron and Steel, Germany; Aktien-Gesellschaft derDillinger Hüttenwerke, Research & Development Iron and Coke Making, Germany</p> <p>IMPACT OF ANNEALING CYCLE PARAMETERS ON BATCH ANNEALING PROCESS PERFORMANCE IN TINPLATE MANUFACTURING Lydia Schoina; Ray Jones; Spencer Burgess; Daniel Vaughan; Amanda Foley; Leighton Andrews; Agustin Valera Medina College of Physical Sciences and Engineering, Cardiff University, United Kingdom; Tata Steel UK Trostre Works, United Kingdom</p>

<p>COMPARISON BETWEEN DIFFERENT FLAMES IN A MULTI-FEED TEST FACILITY AND DEVELOPING A FLAME LIFT-OFF DETECTOR USING AUTOENCODER NEURAL NETWORKS Mohsen Gharib; Paul Tischer; Olaf Schulze; Martin Gräbner; Andreas Richter Chair of Energy Process Engineering, TU Bergakademie Freiberg, Germany</p> <p>AN ADAPTIVE AND FLEXIBLE BIOMASS POWER PLANT CONTROL SYSTEM BASED ON ON-LINE FUEL IMAGE ANALYSIS Thomas Plankenbühler; Dominik Müller; Jürgen Karl Friedrich-Alexander University Erlangen-Nürnberg, Germany</p>	<p>COMPUTATIONALLY EFFICIENT ALTERNATIVE TO A FULL SCALE TRANSIENT SIMULATION OF A REHEATING FURNACE Zaaquib Ahmed Ghent University, Belgium</p> <p>CFD INVESTIGATION OF ALUMINIUM MELTING FURNACE PERFORMANCE FOR DIFFERENT BURNERS' HEADS Aleksandra Kiedrzyńska; Beata Glot; Jaroslaw Hercog; Akin Obali; Kadir Kosoglu; Deniz Urk; Tutku Ozen; Hasan Taskin Institute of Power Engineering, Thermal Processes Department, Poland; Sistem Teknik Industrial Furnace Ltd. R&D Center; ASAS Aluminyum A.S., Turkey</p>
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12:35 – 13:50

LUNCH

13:50 – 14:40

KEYNOTE LECTURE III

Decarbonising steel heat treatment furnaces and annealing lines

Sébastien Caillat
Fives Group, France

14:45 – 16:05

PARALLEL SESSIONS III

<p>S5: Combustion & Heat Transfer Chair: Palma González García Room: Pacific</p>	<p>S6: Modelling Chair: TBC Room: Indian</p>	<p>S7: Alternative Fuels Chair: Amanda Lea-Langton Room: Atlantic</p>
<p>FIRING HYDROGEN IN PROCESS BURNERS Michel Haag; Charles Baukal; Gilles Theis; Bill Johnson John Zink Hamworthy Combustion (Luxembourg, USA)</p> <p>IMPLICATIONS AND RISKS ASSOCIATED TO HYDROGEN HYBRIDIZATION OF PREMIXED DOMESTIC BURNERS Andrea Aniello; Thierry Poinso; Laurent Selle; Thierry Schuller Institut de Mécanique des Fluides de Toulouse, IMFT, Université de Toulouse, CNRS, France</p>	<p>ROADMAP FOR AN ENERGY EFFICIENT FIRING OF CERAMICS Tino Redemann; Eckehard Specht Otto von Guericke University Magdeburg, Germany</p> <p>MODELING OF RADIATION HEAT TRANSFER IN THE DENSE-BED FLOW OF SOLID PYROLYSIS IN INDIRECTLY HEATED ROTARY KILNS Salar Tavakkol; Thorsten Zirwes; Henning Bockhorn; Dieter Stapf Karlsruhe Institute of Technology, Germany</p>	<p>PYROLYSIS OF WASTE PLASTICS UNDER REBURNING CONDITIONS Yifan Du; Mohammadhadi Nakhaei; Hao Wu Department of Chemical and Biochemical Engineering, Technical University of Denmark, Denmark</p> <p>THE EFFECT OF COLD-END SULFURIC ACID INDUCED CORROSION ON WEATHERING STEEL CORROSIVE RESISTANCE UNDER BOILER CONDITIONS Nicole Laws; Ziad Dawood; Sreenivasa Gubba; Saumitra Saxena; Anand Krishnamurthy; William Roberts KAUST, Saudi Arabia</p>

<p>CHANGES DUE TO H₂-FUEL WHILE OPERATING RECUPERATIVE AND PULSE FIRED BURNERS Matthias Rieken Honeywell, Germany</p> <p>TENOVA SMARTBURNERS: FULL HYDROGEN FLEXIBILITY TO REDUCE FURNACES CO₂ FOOTPRINT Davide Astesiano; Mattia Bissoli; Alessandro Della Rocca; Enrico Malfa Tenova S.p.A., Italy</p>	<p>NUMERICAL MODELLING OF AN INDUSTRIAL ROTARY KILN Senthilathiban Swaminathan; Christoph Spijker; Markus Gruber; Irmela Kofler; Harald Raupenstrauch K1-MET GmbH; Montanuniversity Leoben, Austria; RHI Magnesita GmbH, Austria</p> <p>EFFECTS OF PULSED GLIDING ARC PLASMA ON NON-PREMIXED CH₄-AIR FLAME STABILITY Ahlem Ghabi; Thibault Darny; Sebastien Dozias; Eric Robert; Pablo Escot-Bocanegra; Toufik Boushaki CNRS, ICARE, GREMI, University of Orleans; GREMI, CNRS, Universit of Orleans; ICARE CNRS - University of Orleans, France</p>	<p>FLUIDIZED BED CHEMICAL LOOPING PROCESS FOR GREEN SYNGAS PRODUCTION Francesco Miccio; Alba Storione; Matteo Minelli; Elena Landi; Ferruccio Doghieri ISTEC-CNR Faenza, Italy; DICAM UNIBO Bologna, Italy</p> <p>INVESTIGATION OF POLYMER RICH WASTE STREAMS IN AN INDUSTRIAL SIZED FLUIDIZED BED REACTOR Martin Seemann; Isabel Cañete Vela, Henrik Thunman; Teresa Berdugo Vilches; Jelena Maric CHALMERS UNIVERSITY OF TECHNOLOGY, Sweden</p>
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16:05 – 16:35

COFFEE – BREAK

16:35 – 17:55

PARALLEL SESSIONS IV

<p>S8: Combustion & Heat Transfer Chair: Harald Raupenstrauch Room: Pacific</p>	<p>S9: Monitoring Chair: Neil Fricker Room: Indian</p>	<p>S10: Alternative Fuels Chair: Jean-Bernard Michel Room: Atlantic</p>
<p>PILOT TESTING AND NUMERICAL SIMULATIONS OF THE MULTIFUEL BURNER FOR THE CEMENT KILN Jarosław Hercog; Robert Lewtak; Valter Domingos Tavares; Angela Maria Nunes; Daniela Gaspar Institute of Power Engineering, Thermal Processes Department, Poland; SECIL SA, Portugal</p> <p>EXPERIMENTAL EVALUATION OF 100% OXYFUEL COMBUSTION CHARACTERISTICS FOR CEMENT PRODUCTION Cynthia Kroumian; Joerg Maier Institute of Combustion and Power Plant Technology, University of Stuttgart, Germany</p>	<p>STUDIES ON THE WASTE FEEDING PROCESS IN LARGE-SCALE WASTE INCINERATION PLANTS – EPISODE 2: A SEQUEL INTRODUCING FURTHER IMPROVEMENTS BY APPLYING NEW MEASUREMENT TECHNOLOGY Martin Zwiellehner SAR GmbH, Process- and Environmental Technology, Germany</p> <p>ANALYSIS OF SPATIAL FLIGHT PROPERTIES OF REFUSE-DERIVED FUEL PARTICLES BASED ON A LIGHT-FIELD CAMERA SYSTEM Miao Zhang; Markus Vogelbacher; Krasimir Aleksandrov; Hans-Joachim Gehrman (Germany); Dieter Stapf; Robin Streier; Siegmart Wirtz; Viktor Scherer; Jörg Matthes Karlsruhe Institute of Technology; Ruhr-University Bochum, Germany</p>	<p>TAILORED PRODUCTION AND APPLICATION OF BIOCHAR FOR TAR REMOVAL Alba Dieguez-Alonso; Hernán Almuina-Villar; Tu-Lien Eliane Vu-Han; José María De La Rosa; Frank Behrendt Otto von Guericke University Magdeburg; Technische Universität Berlin, Germany; IRNAS-CSIC, Spain</p> <p>DETERMINATION OF THE STATISTICS OF THE AERODYNAMIC PROPERTIES OF REFUSE DERIVED FUEL BY COMPUTER VISION Siegmart Wirtz; Krasimir Aleksandrov; Hans-Joachim Gehrman; Dieter Stapf; Miao Zhang; Markus Vogelbacher; Jörg Matthes; Viktor Scherer; Robin Streier</p>

<p>CONTACT HEAT TRANSFER ANALYSIS IN FLIGHTED ROTARY KILNS Jakob Seidenbecher; Fabian Herz; Eckehard Specht; Alba Dieguez-Alonso Otto von Guericke University Magdeburg; Anhalt University of Applied Sciences, Germany</p> <p>ADAPTION OF A 300 KWTH PILOT PLANT FOR TESTING THE INDIRECTLY HEATED CARBONATE LOOPING PROCESS FOR CO2 CAPTURE FROM LIME AND CEMENT INDUSTRY Carina Hofmann; Martin Greco-Coppi; Jochen Ströhle; Bernd Epple Technische Universität Darmstadt, Institute for Energy Systems and Technology, Germany</p>	<p>INFLUENCE OF POTASSIUM IN INDUSTRIAL SCALE FLUIDIZED BED COMBUSTORS AND GASIFIERS Martin Seemann; Tomas Leffler; Jelena Maric; Teresa Berdugo; Henrik Thunman Chalmers University of Technology, Sweden</p> <p>OPTICAL SOFT SENSING FOR MILD COMBUSTION MONITORING IN A SCALE-BRIDGING BURNER Giovanni Battista Ariemma; Mara De Joannon; Pino Sabia; Giancarlo Sorrentino; Raffaele Ragucci STEMS-CNR; DICMAPI – UNINA, Italy</p>	<p>Ruhr-University Bochum, Department of Energy Plant Technology; Karlsruhe Institute of Technology, Institute of Technical Chemistry, Institute for Automation and Applied Informatics, Germany</p> <p>EFFECT OF MOISTURE CONTENT OF SOLID WOODY BIOFUEL ON THE BOILERS PERFORMANCE Nerijus Striūgas Lithuanian Energy Institute Laboratory of Combustion Processes, Lithuania</p> <p>GREEN COAL SUBSTITUTES FOR BOILERS THROUGH BIOMASS HYDROTHERMAL CARBONIZATION Jannik Böttger; Till Eckhard; Christin Pflieger; Osvalda Senneca; Martin Muhler; Francesca Cerciello Ruhr-Universität Bochum, Germany; Stems CNR, Italy</p>
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▪ **THURSDAY: 21TH APRIL**

08:30 – 09:20

KEYNOTE LECTURE IV

Metal energy carriers: renewable fuels for the future

Philip de Goey

Eindhoven University of Technology, Netherlands

09:25 – 10:45

PARALLEL SESSIONS V

<p>S11: Combustion & Heat Transfer Chair: Sébastien Caillat Room: Pacific</p>	<p>S12: Modelling Chair: Reinhold Kneer Room: Indian</p>
<p>NOVEL FLOW VISUALIZATION TECHNOLOGY FOR INDUSTRIAL FURNACES Margherita Dotti; Christopher Falholt Elvebakken; Sønnik Clausen; Søren Post; Peter Arendt Jensen Department of Chemical and Biochemical Engineering, Technical University of Denmark</p>	<p>ACCURATE THERMAL ANALYSIS OF OIL/GAS BOILERS BY INTEGRATED USE OF CFD AND FIELD DATA Gianluca Rossiello; Massimo Rogora; Thomas Giani; Ruggiero Dadduzio; Vincenzo Panebianco; Giulia Luca; Luca Erbizzi; Marco Torresi; Giuseppe Blasi; Seyed Behzad Ahmadpanah; Alessandro Saponaro Itea SpA, Italy; AC Boilers SpA, Italy; Department of Mechanics, Mathematics and Management, Polytechnic University of Bari, Italy; Centro Combustione Ambiente SpA, Italy</p>

NEW TECHNOLOGY FOR ENERGY-EFFICIENT AND ULTRA-LOW NOX ANNEALING OF STEEL

Joachim Von Scheele; Anders Carlsson; Mats Jonsson
Linde Technology, Linde plc, Germany, Sweden

APPLICATION OF THERMAL PLASMA TORCH FOR STEEL HEAT-TREATMENT FURNACES: RESULTS FROM THE 250 KW PILOT-SCALE TESTS

Ilman Nuran Zaini; Rikard Svanberg; Daniel Sundberg; Kristofer Bölke; Weihong Yang
KTH Royal Institute of Technology, Sweden;
ScanArc Plasma Technologies AB, Sweden;
Linde Gas AB, Sweden

NUMERICAL INVESTIGATION OF AN INNOVATIVE FURNACE CONCEPT FOR COIL COATING PROCESS

Bruno A. C. Barata, Beatriz S. Dias, Jorge E. P. Navalho, Michael Schneider, Petra Weinbrecht, Christof Weis, Dimosthenis Trimis, José C. F. Pereira
Instituto Superior Técnico, Universidade de Lisboa, Portugal; Karlsruhe Institute of Technology (KIT), Germany

EXPERIMENTAL AND NUMERICAL ANALYSIS OF A GAS DIRECTLY-FIRED BATCH FURNACE

Nicolas Torino; William Dempster; Jonathan Corney; Sebastien Nouveau
Department of Design, Manufacturing and Engineering Management, University of Strathclyde; Department of Mechanical and Aerospace Engineering, University of Strathclyde; Materials and Processes Institute, University of Edinburgh, UK; Aubert&Duval, UK

NUMERICAL SIMULATION OF THE GAYA METHANATION REACTOR

Nicolas Meynet; Yilmaz Kara; Marion Maheut; Jonathan Maistrello
ENGIE, France

NUMERICAL STUDY OF THE EFFECTS OF GLOBAL EQUIVALENCE RATIO ON TURBULENT SWIRLING NON-PREMIXED FLAME

Sawssen Chakchak; Ammar Hidouri; Mouldi Chrigui; Toufik Boushaki
ICARE CNRS, Université d'Orléans; National Engineering School of Monastir, University of Monastir; Research Unit MEER, Faculty of Sciences of Gafsa, University of Gafsa; National Engineering School of Gabes, University of Gabes, Tunisia

10:45 – 11:15 COFFEE – BREAK

11:15 – 12:35 PARALLEL SESSIONS VI

S13: Combustion & Heat Transfer

Chair: Peter Jansohn
Room: Pacific

METHOD FOR CALCULATING THE UREA RELEASE AND DECOMPOSITION IN THE NOXOUT PROCESS IN THE CONTEXT OF A LIVE OPTIMIZATION APPROACH

Daniel Beerbaum; Daniel Bernhardt; Tobias Jakobs; Michael Beckmann; Thomas Kolb
EVT, TU Dresden, Germany; ITC, Karlsruhe Institute of Technology, Germany

3D-PRINTED BURNER FOR EFFICIENT HEAT RECUPERATION

Tim Schneider; Marcel Fiehl; Anne Giese; Bernd Feller; Dan-Adrian Moldovan; Jens Te Kaat
Gas- und Wärme-Institut Essen e.V.; Kueppers Solutions GmbH, Germany

S14: Alternative Fuels

Chair: Francesca Cerciello
Room: Indian

NUMERICAL ANALYSIS OF THE COLD GAS EFFICIENCY IN SEWAGE SLUDGE GASIFICATION

Corinna Netzer; Ning Guo; Ivar Ståle Ertesvåg; Terese Løvås
Department of Energy and Process Engineering, Faculty of Engineering, NTNU Norwegian University of Science and Technology, Norway

ENERGETIC VALORISATION OF TANNERY SLUDGES BY GASIFICATION IN FLUIDISED BED

Massimo Urciuolo; Renata Migliaccio; Giovanna Ruoppolo; Francesca Di Lauro; Marco Balsamo; Fabio Montagnaro; Edoardo Imperiale; Daniela Caracciolo
Istituto di Scienze e Tecnologie per l'Energia e la Mobilità Sostenibili, Consiglio Nazionale delle Ricerche, Italy; Dipartimento di Scienze Chimiche, Università degli Studi di Napoli Federico II, Italy; Stazione Sperimentale per l'Industria delle Pelli e

<p>EFFICIENT MODELLING OF HEAT EXCHANGERS IN SELF-RECUPERATIVE BURNERS FOR THE TEMPERATURE PREDICTION OF SINGLE-ENDED RADIANT TUBES Nicolas Dinsing; Nico Schmitz; Herbert Pfeifer Department for Industrial Furnaces and Heat Engineering, RWTH Aachen University, Germany</p> <p>EXPERIMENTAL AND NUMERICAL INVESTIGATION OF MULTI-STAGE FLAMELESS OXIDATION FOR THE COMBUSTION OF ALTERNATIVE FUELS Enrico Cresci; Joachim G. Wünnig; Linda Giesler; Nico Schmitz; Herbert Pfeifer WS Wärmeprozessestechnik GmbH; Department for Industrial Furnaces and Heat Engineering at RWTH Aachen University, Germany</p>	<p>delle Materie Concianti, Comprensorio Adriano Olivetti, Italy</p> <p>SOLUTIONS OF SEWAGE SLUDGE MONO COMBUSTION WITH AN INTEGRATED ROTARY KILN IN AN EXISTING WASTE TO ENERGY PLANT Bernhard Zimmermann, Alexander Simon, Fabian Fonseca Mitsubishi Power Europe GmbH, Germany</p> <p>CONVERSION OF A PF FIRED STEAM GENERATOR TO WASTE-DERIVED FUEL Sebastian Rehfeldt; Phil Jenkinson; Christian Schoder Mitsubishi Power Europe GmbH, Germany; SIMEC Uskmouth Power Limited, UK</p>
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12:35 – 13:50

LUNCH

13:50 – 14:30

POSTER SESSION - SHORT PRESENTATIONS

14:30 – 15:45

POSTER SESSION

<p>Poster Session Section I (Session chair: Neil Fricker; Room: Indian)</p> <p>P1: A CFD STUDY OF THE PERFORMANCE OF HORIZONTAL DILUTION TUBES Hartmut Mätzing; Petros Vlavakis; Dimosthenis Trimis; Dieter Stapf Karlsruhe Institute of Technology (KIT), Germany</p> <p>P2: INTEGRATION OF INDUSTRY 4.0 CONCEPTS FOR AUTOMATION AND DIGITALIZATION OF FURNACE CONTROL SYSTEMS AS ENABLER FOR OPTIMIZATION AND CHANGEABILITY IN OPERATION Julian Grothoff; Ramy Hana; Lukas Sankowski; Benedikt Schmetz; Stefan Ruland; Marco Zander; Nico Schmitz; Tobias Kleinert; Nicolas Camargo Torres RWTH Aachen University, Germany; H. ZANDER GmbH & Co. KG, Germany</p> <p>P3: A SIMPLE MILD BURNER CONFIGURATION FOR LOW CALORIFIC VALUE GASEOUS FUEL K Muthu Kumar; Ambatipudi Mani Kalyani; B Vignesh; M Revanth; S Varunkumar Department of Aerospace Engineering, IIT Madras, Chennai, India; Department of Mechanical Engineering, IIT Madras, Chennai, India</p> <p>P4: DEVELOPMENT OF A BURNER TESTING FACILITY Christoph Spijker; Harald Raupenstrauch; Hannes Nestelberger Montanuniversitaet Leoben; M.A.L. Metallbau Anlagenservice – Leitungsbau Gesellschaft m.b.H., Austria</p> <p>P5: IMPROVEMENT OF IMPLICITLY SOLVED, MULTIPLE 1D SIMULATIONS OF INDUSTRIAL FURNACES IN REGARD OF PROPERTY DETERMINATION AND USABILITY Andreas Rath; Christoph Spijker; Harald Raupenstrauch Montanuniversitaet Leoben, Austria</p> <p>P6: INFLUENCE OF HYDROGEN ADMIXING TO METHANE ON THE COMBUSTION PERFORMANCE OF A COMMERCIAL PREMIXED BURNER Mariano Massa; Thierry Schuller; Laurent Selle IMFT, France</p>

P7: INVESTIGATIONS ON THE USE OF HYDROGEN IN MULTISTAGE FLAMELESS OXIDATION

Linda Giesler; Nico Schmitz; Herbert Pfeifer; Enrico Cresci; Joachim G. Wüning
RWTH Aachen University, Department for Industrial Furnaces and Heat Engineering; WS
Wärmeprozessestechnik GmbH, Germany

P8: MR

Jorge Pereira
BA Glass, Portugal

P9: SIMULATION OF FLAMES IN THE PACKED BED OF SHAFT KILNS

Ali Chitsazan, Kamyar Mohammadpour, Eckehard Specht
Institute of Fluid Dynamics and Thermodynamics, Otto von Guericke University Magdeburg, Germany

P10: NUMERICAL AND EXPERIMENTAL CHARACTERIZATION OF HEAT TRANSFER CHARACTERISTICS WITHIN A MODEL BAKING OVEN BASED ON REFLECTION OF NIR AND IR THERMAL RADIATION

Vojislav Jovicic; Mohammad Moataz; Ana Zbogar-Rasic; Antonio Delgado
Friedrich-Alexander University Erlangen-Nuremberg, Institute of Fluid Mechanics, Germany

P11: DEEP LEARNING-BASED SEGMENTATION OF OVERLAPPING FLAMES IN INDUSTRIAL COMBUSTION CHAMBERS

Markus Vogelbacher; Patrick Waibel; Julius Großkopf; Jörg Matthes
Institute for Automation und Applied Informatics, Karlsruher Institute of Technology, Germany; Kistler
Group, Competence Center Vision Systems, Germany

P12: FLASH PYROLYSIS OF WALNUT SHELLS AND POPLAR IN N₂ AND CO₂: PYROLYSIS KINETICS, PORE EVOLUTION AND A MODEL FOR EVALUATION OF PYROLYSIS SPECIES

C. Ontyd, E. Freisewinkel, C. Wedler, T. Eisenbach, R. Span, O. Senneca, V. Scherer
Institute of Energy Plant Technology, Germany

P13: DEVELOPMENT OF DESIGN TOOL FOR A SOPHISTICATED WASTE INCINERATION PLANT

Somrat Kerdsuwan; Krongkaew Laohalidanond
King Mongkuts University of Technology North Bangkok, Thailand

P14: EFFECT OF KILN CAR ON THE TUNNEL KILN PROCESS

Denny Mathew Alex; Tino Redemann; Eckehard Specht
Otto von Guericke University Magdeburg, Germany

Section II (Chair: Viktor Scherer; Room: Atlantic)

P15: EVALUATION OF PROCESS MODELLING APPROACHES FOR BIOMASS AND PULVERIZED FUEL-FIRED FURNACES AND RADIANT HEAT EXCHANGERS USING CFD

Pieter Rousseau; Ryno Laubscher; Etienne De Villiers
University of Cape Town; John Thompson Power, South Africa

P16: EXPERIMENTAL ANALYSIS OF THE DRYING PROCESS IN ROTARY KILNS

Claudia Meitzner; Bilal Mehdi; Jakob Seidenbecher; Eckehard Specht
Otto-von-Guericke Universität, Germany

P17: EXPERIMENTAL INVESTIGATION OF MINERAL SORBENTS FOR ALKALI REMOVAL IN A NOVEL TWO-STAGED THERMOGRAVIMETRIC ANALYSIS SYSTEM

Hendrik Mörtenkötter; Sebastian Fendt; Hartmut Spliethoff
Chair of Energy Systems, TU München, Germany

P18: EXPERIMENTAL INVESTIGATION OF THE COMBUSTION OF WOOD CHIPS WITH VARYING WATER CONTENTS ON A STOKER GRATE

Carl Hentschel; Siegmart Wirtz; Viktor Scherer
Department of Energy Plant Technology, Ruhr-University Bochum, Germany

P19: MINERAL EFFECTS ON CHEMICAL AND PHYSICAL TRANSFORMATIONS OF CELLULOSE-BASED MODEL FUELS IN N₂ AND CO₂ ATMOSPHERES

Till Eckhard; Christin Pflieger; Carmela Russo; Jannik Böttger; Osvalda Senneca; Barbara Apicella; Martin Schiemann; Viktor Scherrer; Martin Muhler; Francesca Cerciello
Laboratory of Industrial Chemistry, Ruhr University Bochum; STEMS - CNR Napoli, Italy; Department of Energy Plant Technology, Ruhr University Bochum, Germany

P20: MITIGATION OF POLLUTANT EMISSIONS FROM RESIDENTIAL BIOMASS BOILERS

Marco Pellegrini; Cesare Sacconi; Alessandro Guzzini
University of Bologna, Italy

P21: MODELLING OF METAL AND STEAM TEMPERATURE DISTRIBUTION IN THE SUPERHEATER OF THE PULVERISED COAL BOILER

Norbert Modliński
Wrocław University of Science and Technology, Poland

P22: OPTIMIZATION OF OVERFIRE AIR FOR IMPROVED PERFORMANCE AND NOX REDUCTION IN A COMMERCIAL WALL-FIRING COAL BOILER

Woosuk Kang; Hyunbin Jo; Changkook Ryu; Jongwook Lee
School of Mechanical Engineering, Sungkyunkwan University, Republic of Korea; BHI Co. Ltd., Republic of Korea

P23: NUMERICAL STUDY OF BIOMASS COMBUSTION IN AN INDUSTRIAL GRATE-FIRED BOILER

João Pedro Silva; Senhorinha Teixeira; José Carlos Teixeira; Bernhard Peters
University of Minho, Portugal; University of Luxembourg

P24: OSCILLATING COMBUSTION FOR NOX- REDUCTION IN PULVERIZED FUEL BOILERS

Nicklas Jolibis; Thomas Freudenmann; Hans-Joachim Gehrman; Dieter Stapf; Helmut Seifert; Patrick Waibel; Markus Vogelbacher; Hubert Keller; Manuela Hauser
BASF; Engineering Data Intelligence; Karlsruhe Institute of Technology (KIT), Germany

P25: QUALITY ASSESSMENT OF RDF IN THE KILN FIRING OF CEMENT PLANTS

Siegmar Wirtz; Viktor Scherer; Stefan Schäfer; Nils Bodendiek; Volker Hoenig; Henrik Van Thriel
Department of Energy Plant Technology, Ruhr-University Bochum; VDZ Technology gGmbH, Germany

P26: SIMULATION OF GRANULAR FLOW AND HEAT TRANSFER IN THE BULK BED OF ROTARY KILNS

Lanyue Zhang; Fabian Herz; Fabian Weigler; Jochen Mellmann
Anhalt University of Applied Sciences; Leibniz Institute for Agricultural Engineering and Bioeconomy, Germany

P27: THE COMBUSTION OF DROPLETS OF LIQUID BIO-FUELS AND FINELY DIVIDED BIOMASS PARTICLES

Amanda Lea-Langton; Keith Bartle; Alan Williams
University of Leeds; University of Manchester, UK

P28: SUBSTITUTION OF PET COKE WITH BIOMASS IN MAGNESIA SECTOR

Nikolaos Margaritis; Andreas Maropoulos; Panagiotis Grammelis; Haris Yiannoulakis; Polykarpos Papageorgiou
Research and Development Center, Grecian Magnesite S.A., Greece; Yerakini Mines and Works, Grecian Magnesite S.A.; Centre for Research & Technology Hellas/Chemical Process and Energy Resources Institute (CERTH/CPERI), Greece

16:30 – 20:00

BUS TOUR - ALGARVE

▪ **FRIDAY: 22TH APRIL**

08:30 – 09:20

KEYNOTE LECTURE V

The role of BECCS and hydrogen in delivering Net Zero

Amanda Lea-Langton
University of Manchester, UK

09:25 – 10:45

PARALLEL SESSIONS VII

<p>S15: Combustion & Heat Transfer Chair: Viktor Scherer Room: Pacific</p>	<p>S16: Pollutants Chair: Christoph Spijker Room: Indian</p>	<p>S17: Monitoring Chair: Herbert Pfeifer Room: Atlantic</p>
<p>EFFECTS OF NATURAL ILMENITE FOR OXYGEN CARRIER AIDED COMBUSTION ON THE PERFORMANCE OF SMALL- TO MID-SCALE BIOMASS BUBBLING FLUIDIZED BED BOILERS Tanja Schneider; Dominik Müller; Jürgen Karl Friedrich-Alexander-University Erlangen-Nürnberg, Chair of Energy Process Engineering, Germany</p> <p>HYDROGEN ADMIXTURE IN METHANE OXY-FLAMES: SPECTROSCOPIC, UV-VIS OPTICAL AND TEMPERATURE INVESTIGATIONS Sven Eckart; Anna Hasch; Sven Heryn Wohlfarth; Ralph Behrend; Hartmut Krause Institute of Thermal Engineering, TU Bergakademie Freiberg, Germany</p>	<p>EXHAUST GAS RECIRCULATION (EGR) ANALYSIS OF A SWIRL-STABILIZED PULVERIZED COAL FLAME WITH FOCUS ON NOX RELEASE USING FPV-LES Dominik Meller; Linus Engelman; Patrick Wollny; Oliver T. Stein; Andreas Kronenburg; Christian Hasse; Andreas Kempf University of Duisburg-Essen, Chair of Fluid Dynamics; University of Stuttgart, Institute for Combustion Technology (ITV), Germany; TU Darmstadt, Simulation of reactive Thermo-Fluid Systems (STFS), Germany</p> <p>REDUCTION OF NITROGEN OXIDE IN A GRATE FURNACE WITH OSCILLATING COMBUSTION – EXPERIMENTS AND SIMULATIONS Hans-Joachim Gehrman; Bo Jaeger; Siegmund Wirtz; Viktor Scherer; Krasimir Aleksandrov; Manuela Hauser; Dieter Stapf; Gregor Pollmeier; Philipp Danz Karlsruhe Institute of Technology; Department of Energy Plant Technology; Institute for Technical Chemistry; POLZENITH GmbH & Co. KG; b&d Energie- und Umwelttechnik GmbH, Germany</p>	<p>HELPING BUILD A DECARBONISATION TOOL-BOX FOR FURNACE AND BOILER APPLICATIONS IN GLASS, METALS, STEAM REFORMING, CEMENT AND BIOMASS, USING HIGH ACCURACY IN-FURNACE THERMAL IMAGING Neil George Simpson AMETEK Land, UK</p> <p>ONLINE CORROSION MONITORING IN INDUSTRIAL BOILERS Bernd Epple; Adrian Marx; Andreas Müller; Falk-Olaf Ewert; Jens Peitan Institute of Energy Systems and Technology - TU Darmstadt, Germany; MHKW Berlin-Ruhleben, Germany</p>

<p>INVESTIGATION OF THE HEAT TRANSFER WITHIN THE HYDROGEN-FIRED, THERMAL-OIL BOILER DEVELOPED FOR THE DEHYDROGENATION OF LIQUID ORGANIC HYDROGEN CARRIERS Mohammad Moataz; Ana Zbogar-Rasic; Vojislav Jovicic; Elke Padberg; Thomas Bures; Antonio Delgado Institute of Fluid Mechanics (LSTM) at Friedrich-Alexander University (FAU) in Erlangen, Germany; ASCENTEC GmbH, Wiesloch heaters & heating solutions, St. Leon-Rot, Germany; German Engineering Research and Development Center LSTME Busan, Republic of Korea</p> <p>EFFECT OF CARBON DIOXIDE ADDITION ON THE GLOBAL STRUCTURE OF HYDROGEN FLAMES Sven Eckart; Gianmaria Pio; Thorsten Zirwes; Feichi Zhang; Henning Bockhorn; Hartmut Krausse; Ernesto Salzano Institute of Thermal Engineering, TU Bergakademie Freiberg, Germany; University of Bologna, Italy; Karlsruhe Institute of Technology, Germany</p>	<p>MODELLING OF NEW LOW-NOX TECHNOLOGIES IN INDUSTRIAL BURNER APPLICATIONS USING THE REACTOR NETWORK MODEL Virginia Fratalocchi; Michael Pichler; Stefan Riebenbauer Siemens Digital Industries Software, UK; DUMAG GmbH, Austria; ACAM Engineering GmbH, Austria</p>	<p>OVERALL PLANT OPTIMISATION BY AUTOMATIC CONTROLLING WITH ACOUSTIC GAS TEMPERATURE MEASUREMENT – IMPROVEMENT OF EFFICIENCY, EMISSIONS, AND PLANT AVAILABILITY Matthias Ritter; Atul Sharma; Martin Brodeck Bonnenberg & Drescher GmbH, Germany</p> <p>COMPARISON OF COMPUTER VISION METHODS FOR IDENTIFICATION OF REFUSE-DERIVED FUEL PARTICLES Jonas Fischer; Siegmart Wirtz; Viktor Scherer Ruhr University Bochum, Department of Energy Plant Technology, Germany</p>
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10:45 – 11:15

COFFEE – BREAK

11:15 – 12:35

PARALLEL SESSIONS VIII

<p>S18: Modelling Chair: Viktor Scherer Room: Pacific</p>	<p>S19: Alternative Fuels Chair: TBC Room: Indian</p>
<p>OPTIMIZATION OF THE RATIO AND FEEDING OF THE O₂/CO₂ MIXTURE TO THE MUNICIPAL SOLID WASTE INCINERATION PROCESS IN A MOVING GRATE BOILER Paulina Wienchol; Andrzej Szlęk; Mario Ditaranto Silesian University of Technology, Poland; SINTEF Energy Research, Norway</p>	<p>EXPERIMENTAL INVESTIGATION OF SINGLE WOOD PARTICLE COMBUSTION IN AIR AND DIFFERENT O₂/CO₂/H₂O ATMOSPHERES Alexander Mack Institute of combustion and power plant technology, University of Stuttgart, Germany</p>
<p>SIMULATION OF MOVING GRATE WASTE INCINERATORS USING THE CONTINUOUS POROUS MEDIUM APPROACH: A COMPARISON BETWEEN THE CONVENTIONAL FIXED BED METHOD AND A NEW FEEDING METHOD Quynh N. Hoang; Maarten Vanierschot; Tom Croymans; Rudi Pittoors; Jo Van Caneghem Department of Materials Engineering, KU Leuven, Belgium; Applied Mechanics and Energy Conversion (TME), KU Leuven, Belgium; Keppel Seghers Belgium NV, Belgium</p>	<p>KINETICS OF COMBUSTION OF LIGNOCELLULOSIC BIOMASS: RECENT RESEARCH AND CRITICAL ISSUES Osvalda Senneca CNR-STEMS, Italy</p>

<p>NUMERICAL INVESTIGATION ON BIOMASS COMBUSTION FOCUSING HIGH-TEMPERATURE DEGRADATION IN RECIPROCATING GRATES Moisés Sousa; Felipe Menon; Edson Bazzo Federal University of Santa Catarina Department of Mechanical Engineering, Florianópolis - SC - Brazil; Federal University of the South and Southeast of Pará Department of Mechanical Engineering, Marabá - PA - Brazil; Department of Mechanical Engineering, Florianópolis - SC - Brazil LabCET – Laboratory of Combustion and Thermal System Engineering</p> <p>AN EXPERIMENTAL AND KINETIC MODELING STUDY OF THE EFFECT OF ALKALI SPECIES ON CO OXIDATION Arphaphon Chanpirak; Hao Wu; Peter Glarborg Department of Chemical and Biochemical Engineering, Technical University of Denmark, Denmark</p>	<p>INFLUENCE OF ADDITIVE SINTERING ON FINE PARTICLE FORMATION DURING BIOMASS PULVERISED-FUEL COMBUSTION Richard Nowak Delgado; Sebastian Fendt; Hartmut Spliethoff Chair for Energy Systems, Technical University Munich, Germany</p> <p>MODELLING SOLID RECOVERED FUEL (SRF) COMBUSTION FOR THERMAL POWER GENERATION Anura Perera Anura Perera; Mike Kryjak; Lawrence Berg; John Goldring; Gerry Riley RJM International, UK</p>
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12:35 – 13:50

LUNCH

13:50 – 14:40

KEYNOTE LECTURE VI

Hydrogen and its potential to decarbonise the glass industry

Palma González García
 Glass Futures, UK

14:45 – 16:05

PARALLEL SESSIONS IX

<p>S20: Modelling Chair: TBC Room: Pacific</p>	<p>S21: Alternative Fuels Chair: Hartmut Krause Room: Indian</p>
<p>FLAMELET LES OF OXY-COAL SWIRLING FLAMES USING DIRECTLY COUPLED SEAMLESS MULTI-STEP KINETICS FOR HOMOGENEOUS AND HETEROGENEOUS SOLID FUEL KINETICS Hendrik Nicolai; Paulo Debiagi; Johannes Janicka; Christian Hasse Technische Universität Darmstadt, Germany</p> <p>THERMAL RADIATION AT HIGH-TEMPERATURE AND HIGH-PRESSURE CONDITIONS: COMPARISON OF MODELS FOR DESIGN AND SCALE-UP OF ENTRAINED FLOW GASIFICATION PROCESSES Maximilian Dammann; Marco Mancini; Thomas Kolb; Roman Weber Karlsruhe Institute of Technology, Engler-Bunte-Institute, Fuel Technology; Karlsruhe Institute of Technology, Institute for Technical Chemistry, Gasification Technology, Germany; Clausthal University of Technology, Institute for Energy Process Engineering and Fuel Technology, Germany</p>	<p>INVESTIGATIONS INTO THE USE OF NATURAL GAS/HYDROGEN BLENDS AND HYDROGEN FOR DECARBONIZATION IN THE GLASS INDUSTRY Jörg Leicher; Bledar Islami; Anne Giese; Klaus Görner; Johann Overath Gas- und Wärme-Institut Essen e.V.; Bundesverband Glasindustrie e.V., Germany</p> <p>A COMPARISON OF THE MOST PROMISING LOW-CARBON HYDROGEN PRODUCTION TECHNOLOGIES Sandra Dermühl; Uwe Riedel Institute of Low-Carbon Industrial Processes, German Aerospace Center (DLR), Germany</p>

NUMERICAL STUDIES ON BOILER PERFORMANCE AND INFLUENCE OF BURNER TILT DURING UNEVEN SECONDARY AIR SUPPLY IN A TANGENTIAL-FIRING COAL BOILER

Hyunbin Jo; Jongkeun Park; Woosuk Kang; Jun Seok Hong; Sung Min Yoon; Ho Won Ra; Changkook Ryu
School of Mechanical Engineering, Sungkyunkwan University; R&D Center, Korea Western Power Co., Ltd.; Korea Institute of Energy Research (KIER), Republic of Korea

MODELING OF A PILOT PLANT FOR ENTRAINED FLOW GASIFICATION OF FUEL MIXTURES CONTAINING SEWAGE SLUDGE

Hossein Askarizadeh; Arash Lotfollahzadeh; Christian Wolfersdorf; Stefan Pielsticker; Reinhold Kneer
Institute of Heat and Mass Transfer, RWTH Aachen University, Germany; RWE Power AG, Germany

DETAILED EVALUATION OF TECHNOLOGIES FOR THE PILOT SCALE PYROLYSIS OF PLASTIC WASTES

Jean-Bernard Michel; Drew Gamage; Roger Gumy; Christophe Pot; Julien Ropp; Jacques Richard; Philippe Gaemperle
Humana Consulting; Spontis SA; Sales Challenge Consulting Sàrl; University of Applied Sciences and Arts, Switzerland

DEVELOPMENT AND VALIDATION OF A CHEMICAL REACTOR NETWORK MODEL FOR NH₃/H₂/AIR FLAMES IN A SWIRL BURNER TOWARDS A RICH-QUENCH-LEAN IMPLEMENTATION

Francisco M. Guimarães; Rodolfo C. Rocha; Miguel A. A. Mendes; Pedro J. Coelho
IDMEC, Mechanical Engineering Department, Instituto Superior Técnico, University of Lisbon, Portugal

16:10 – 16:30

CLOSING ADDRESS (Room: Pacific)

Viktor Scherer (Ruhr Universität Bochum, Germany), Neil Fricker (University of South Wales, United Kingdom), Albino Reis (Cenertec – Centro de Energia e Tecnologia, Portugal)

19:00

FAREWELL DINNER at the Hotel NAU São Rafael Atlântico