

Day 1, Wednesday March 22nd 2023

9:00	Welcome Reinhold Kneer & Riccardo Chirone
9:15	Keynote Lecture Room: Auditorium, Chair: Reinhold Kneer
	A Vision of Bioenergy in Future Multicommodity Energy Systems <u>Piero Salatino*</u> *Department of Chemical, Materials and Industrial Production Engineering, University of Naples Federico II, Italy
10:15	Topic: Oxy-Fuel I Room: Auditorium Chair: Andreas Dreizler
	NH₃ oxidation and NH₃-NO interaction in air and oxy-fuel combustion conditions <u>María U. Alzueta*</u> *Aragón Institute of Engineering Research, University of Zaragoza, Spain
10:35	Development of the Modular Staged Pressurized Oxy-Combustion (SPOC) Power Plant Duarte Magalhaes, Mao Cheng, Zhiwei Yang, Piyush Verma, Anand Sankaranarayanan, Zachariah Wargel, <u>Richard L. Axelbaum*</u> *Department of Energy, Environmental and Chemical Engineering, Washington University in St. Louis, United States of America
10:55	Oxy-co-firing coal and agro-waste biomass under O₂/CO₂ and O₂/CO₂/H₂O atmospheres <u>Luis Díez*</u> , Alexander García-Mariaca, Eva Llera, Paula Canalís *Department of Mechanical Engineering, University of Zaragoza, Spain
11:15 -11:45	Coffee Break
11:45	Topic: Oxy-Fuel II Room: Auditorium Chair: Roland Span
	Oxy-fuel combustion of hydrogen for the decarbonization of high-temperature process heat <u>Jörg Leicher*</u> , Tim Nowakowski, Anne Giese, Klaus Görner *Gas- und Wärme-Institut Essen e. V, Germany
12:05	On the inaccuracies of particle models for char gasification Thamali Rajika Jayawickram, Nils Erland H. Haugen, <u>Kentaro Umeki*</u> *Department of Engineering Sciences and Mathematics, Luleå University of Technology, Sweden
12:25	Development of a comprehensive kinetic model of biomass conversion in inert, air and oxy-fuel conditions <u>Paulo Debiagi*</u> , Stefan Pielsticker, Francesca Cerciello, Viktor Scherer, Reinhold Kneer, Tiziano Faravelli, Christian Hasse *Institute for Simulation of Reactive Thermo-Fluid Systems, Technical University of Darmstadt, Germany
12:45-13:45	Lunch

Parallel Sessions		
	Topic: Biomass Pyrolysis Room: Auditorium Chair: Stefan Pielsticker	Topic: Modeling & Simulation I Room: Aula Ferretti Chair: Taraneh Sayadi
13:45	Biomass pyrolysis: critical issue on tar analysis <u>Francesca Cerciello*</u> , Christian Ontyd, Carmela Russo, Erik Freisewinkel, Maria Maddalena Oliano, Osvalda Senneca, Viktor Scherer, Martin Schiemann, Martin Muhler, Barbara Apicella *Faculty of Chemistry and Biochemistry, Ruhr University Bochum, Germany	Sensitivity analysis and uncertainty quantification of an axisymmetric reacting particle <u>Ahmed Hassan*</u> , Lennart Schumacher, Vincent Le Chenadec, Taraneh Sayadi *Institute for Combustion Technology, RWTH Aachen University, Germany
14:05	Influence of minerals on the pyrolysis of hydrothermally carbonized biomass <u>Jannik Böttger*</u> , Till Eckhard, Christin Pflieger, Osvalda Senneca, Martin Muhler, Francesca Cerciello *Faculty of Chemistry and Biochemistry, Ruhr University Bochum, Germany	Numerical study and burner optimization of the non-catalytic partial oxidation of natural gas <u>Gabriel Gonzalez Ortiz*</u> , Yury Voloshchuk, Bernd Meyer, Martin Gräbner, Andreas Richter *Institute of Energy Process Engineering and Chemical Engineering, TU of Bergakademie Freiberg, Germany
14:25	Pyrolysis and combustion of wood pellets submitted to high heating rates: Experiments and modeling <u>Guillaume Gerandi*</u> , Brillard Alain, Schönnenbeck Cornelius, Brilhac Jean-François *Risk and Environmental Management Laboratory, University of Upper Alsace, France	DEM/CFD-Simulation of a generic Lime shaft Kiln: A Numerical Study on Regular and Oxy-fuel Operation <u>Henry Merten*</u> , Enric Illana, Torben Bergold, Siegmart Wirtz, Viktor Scherer *Institute of Energy Plant Technology, Ruhr University Bochum, Germany
14:45	Use of egg shells wastes for catalytic pyrolysis of lignocellulosic biomass <u>Assia Maaoui*</u> , Raouia Chagtmi, Francesca Cerciello, Aida Ben Hassen Trabelsi, Massimo Urciolo, Ferdinando Stanzione, Renata Migliaccio, Osvalda Senneca, Barbara Apicella *Faculty of Sciences of Tunis, University of Tunis El Manar, Tunisia	Single particle conversion of woody biomass using fully-resolved and grid-independent Euler-Lagrange approaches <u>Tien Duc Luu*</u> , Jingyuan Zhang, Shiqi Meng, Oliver Thomas Stein, Andreas Kronenburg, Tian Li, Terese Løvås *Institute for Combustion Technology, University of Stuttgart, Germany
15:05-15:35	Coffee Break	
Parallel Sessions		
	Topic: Gasification, Pyrolysis & Heat Transfer Room: Auditorium Chair: Francesca Cerciello	Topic: Optical Measurements Room: Aula Ferretti Chair: Benjamin Böhm
15:35	Reaction kinetics for pressurized gasification of high-temperature biomass char with steam and mixtures of steam with CO2 <u>Stella Clara Walker*</u> , Thomas Kolb *Engler-Bunte-Institute, Karlsruhe Institute of Technology, Germany	Investigation of oxygen-enriched biomass flames in a lab-scale entrained flow reactor <u>Marcelo Dal Belo Takehara*</u> , Muhammad Aqib Chishty, Kentaro Umeki, Rikard Gebart *Department of Engineering Sciences and Mathematics, Luleå University of Technology, Sweden

15:55	<p>High-temperature pyrolysis of plastics and its implication for the utilization in reburning Yifan Du, Peter Glarborg, <u>Hao Wu</u>* *Department of Chemical and Biochemical Engineering, Technical University of Denmark, Denmark</p>	<p>Combined flow, temperature and soot investigation in oxy-fuel biomass combustion under varying oxygen concentrations using laser-optical diagnostics <u>Henrik Schneider</u>*, Hardy Hamel, Janik Hebel, Johannes Emmert, Benjamin Böhm, Steven Wagner, Reinhold Kneer, Andreas Dreizler *Institute of Reactive Flows and Diagnostics, Technical University of Darmstadt, Germany</p>
16:15	<p>Oxidation of chars with high alkali content <u>Carmen Branca</u>* *Institute of Sciences and Technologies for Sustainable Energy and Mobility (STEMS)-CNR, Italy</p>	<p>An experimental study of the stability and nearfield structure of oxyfuel jet flames at elevated pressures. <u>Muhammad Bukar</u>*, Suman Basnet, Wu, Gaetano Magnotti, *Clean Combustion Research Center, King Abdullah University of Science and Technology, Saudi Arabia</p>
16:35	<p>Fast pyrolysis of biomass of different type and origin: effect on bio-oil and char <u>Assia Maaoui</u>*, Francesca Cerciello, Barbara Apicella, Renata Migliaccio, Ferdinando stanzone, Maria Maddalena Oliano, Aida Ben Hassen Trabelsi, Osvalda Senneca *Faculty of Sciences of Tunis, University of Tunis El Manar, Tunisia</p>	<p>Characterization of the ignition and combustion behaviour of biogenic residues <u>Matteo Giesen</u>*, Daniel Bernhardt, Michael Beckmann *Institute of Process Engineering and Environmental Technology, Technical University of Dresden, Germany</p>
16:55	<p>Bed-to-surface heat transfer in a BFB oxy-fuel combustor <u>Jan Hrdlička</u>*, Jan Opatril, Matej Vodicka *Faculty of Mechanical Engineering, Czech Technical University in Prague, Czech Republic</p>	<p>Investigations on solid fuel particle porosities and their influence on the particle radiation interaction <u>Lukas Pörtner</u>*, Matthias Koch, Stefan Pielsticker, Martin Schiemann, Reinhold Kneer *Institute of Energy Plant Technology, Ruhr University Bochum, Germany</p>

Day 2, Thursday March 23rd 2023

Keynote Lecture		
Room: Auditorium, Chair: Osvalda Senneca		
9:00	Perspectives on Modeling Coal and Biomass Combustion <u>Thomas H. Fletcher*</u> *Chemical Engineering Department, Brigham Young University, United States of America	
Short oral presentation of Posters		
Room: Auditorium Chair: Viktor Scherer		
Poster Session		
Lunch		
Parallel Sessions		
	Topic: Combustion Fundamentals Room: Auditorium Chair: Heinz Pitsch	Topic: Modeling & Simulation II Room: Aula Ferretti Chair: Christian Hasse
13:30	Correlation of chemical and structural pore properties and H₂O vapor adsorption in biomass char particles <u>Tim Eisenbach*</u> , Christin Pflieger, Carsten Wedler, Martin Muhler, Roland Span *Institute for Thermo- and Fluidynamics, Ruhr University Bochum, Germany	Large Eddy Simulation of a 40 kW Self-sustained Pulverized Biomass Combustion chamber using Tabulated Chemistry <u>Pascal Steffens*</u> , Leon Loni Berkel, Sandro Gierth, Paulo Debiagi, Burak Özer, Anna Maßmeyer, Hendrik Nicolai, Christian Hasse *Institute for Simulation of Reactive Thermo-Fluid Systems, Technical University of Darmstadt, Germany
13:50	Modeling homogeneous ignition processes of clustering solid particle clouds in isotropic turbulence <u>Pooria Farmand*</u> , Henrik Nicolai, Lukas Berger, Antonio Attili, Christian Hasse, Heinz Pitsch *Institute for Combustion Technology, RWTH Aachen University, Germany	Evolution of oxygen functional groups during char burnout <u>Özlem Yönder*</u> , Gunnar Schmitz, Christof Hättig *Faculty of Chemistry and Biochemistry, Ruhr University Bochum, Germany
14:10	Thermochemical conversion of sewage sludge for energy and resource recovery: opportunities for hydrogen and bio-materials production <u>Aida Ben Hassen Trabelsi*</u> *Research and Technology Centre of Energy - CRTEn, Tunisia	BE4G ultra-low emissions biomass burner: modelling procedure and full-scale test results <u>Ruggiero Dadduzio*</u> , Massimo Penati, Lorenzo Bini, Massimo Rogora, Maurizio Valenzano, Alessandro Saponaro, Osvalda Senneca, Francesca Cerciello, Christian Ontyd, D. J. Brand, Simona Siena, Feliciano Cesareo, Ali Uzair, Marco Torresi *AC Boilers formerly Ansaldo Caldaie, Italy

14:30	<p>Ignition and flame structures of single coal and walnut shell particles in N₂/O₂ and CO₂/O₂ atmospheres - Particle size effect <u>Tao Li</u>*, Pooria Farmand, Christopher Geschwindner, Heinz Pitsch, Andreas Dreizler, Benjamin Böhm *Institute of Reactive Flows and Diagnostics, Technical University of Darmstadt, Germany</p>	<p>Experimental and numerical investigations of the laminar burning velocities of premixed fuel-rich methane oxy-fuel and oxygen-enhanced flames Christof Weis, Matthias Sentko, <u>Björn Stelzner</u>*, Peter Habisreuther, Nikolaos Zarzalis, Dimosthenis Trimis *Engler-Bunte-Institute, Karlsruhe Institute of Technology, Germany</p>
14:50	<p>Structural Char Models Including Oxygen Functional Groups <u>Vanessa Angenent</u>*, Rochus Peter Schmid *Computational Materials Chemistry Group, Ruhr University Bochum, Germany</p>	<p>Lagrangian point-particle models for non-spherical particles in turbulent flow <u>Laurent André</u>*, Thede Kiwitt, Matthias Meinke, Wolfgang Schröder *Institute of Aerodynamics, RWTH Aachen University, Germany</p>
15:10	<p>Farewell, Drinks, Open-Discussion Osvolda Senneca & Reinhold Kneer</p>	

Poster Session

<p>1 Design of a process plant for oxy-combustion of biogenic, gaseous fuels <u>Felix Lehner*</u>, Martin Meiller *Fraunhofer Institute for Environmental, Safety and Energy Technology, Germany</p>	<p>2 Comprehensive Analysis of the Effect of Oxyfuel Atmospheres on Solid Fuel Combustion using Large Eddy Simulations <u>Leon Loni Berkel*</u>, Pascal Steffens, Hendrik Nicolai, Sandro Gierth, Paulo Debiagi, Henrik Schneider, Andreas Dreizler, Christian Hasse *Institute for Simulation of Reactive Thermo-Fluid Systems, Technical University of Darmstadt, Germany</p>
<p>3 Chemical reactor network modeling of a self-sustained solid fuel combustion chamber under oxy-fuel atmospheres <u>Sören Dübal*</u>, Leon L. Berkel, Paulo Debiagi, Hendrik Nicolai, Tiziano Faravelli, Christian Hasse, Sandra Hartl *Optical Diagnostics and Renewable Energies, Darmstadt University of Applied Sciences, Germany</p>	<p>4 Numerical and experimental investigations regarding methane-hydrogen blends in partially premixed and diffusion flames <u>Marius Stefan Enache*</u>, Tudor Prisecaru, Andreea Mangra, Răzvan Cărlănescu, Florin Florean, Radu Kuncser *National Research and Development Institute for Gas Turbines COMOTI, Romania</p>
<p>5</p>	<p>6 Enhancement of a detailed char conversion model for biomass combustion in oxy-fuel atmospheres <u>David Tarlinski*</u>, Erik Freisewinkel, Daria Golab, Martin Schiemann, Viktor Scherer *Institute of Energy Plant Technology, Ruhr University Bochum, Germany</p>
<p>7 Numerical study of the flame instability in oxy-fuel combustion with differential diffusion effect Xudong Jiang, <u>Junjun Guo*</u>, Hong G. Im, Zhaohui Liu *Clean Combustion Research Center, King Abdullah University of Science and Technology, Saudi Arabia</p>	<p>8 Modeling smoldering combustion of wood <u>Antonio Galgano*</u> *Department of Chemical, Materials and Industrial Production Engineering, University of Naples Federico II, Italy</p>
<p>9 Prediction of pyrolysis kinetics with models of different complexity for isolated biomass components <u>Stefan Pielsticker*</u>, Paulo Debiagi, Francesca Cerciello, Antonio Coppola, Christian Hasse, Reinhold Kneer *Institute of Heat and Mass Transfer, RWTH Aachen University, Germany</p>	<p>10</p>

<p>11 An experimental study on oscillating behaviour of the radiation spectrum of self-sustained biomass flames at different thermal loads <u>Burak Özer*</u>, Reinhold Kneer, Anna Maßmeyer *Institute of Heat and Mass Transfer, RWTH Aachen University, Germany</p>	<p>12 Up-Scaling of a Lab-Scale oxyfuel Burner to a 1 MWth Semi-Industrial Oxyfuel Combustion Chamber <u>Marcel Richter*</u>, Anna Maßmeyer, Hossein Askarizadeh Ravizi, Jochen Ströhle, Bernd Epple *Institute of Energy Systems and Technology, Technical University of Darmstadt, Germany</p>
<p>13 Numerical study on the influence of conversion- and temperature-dependent particle radiative properties in pulverised solid fuel flames Hossein Askarizadeh Ravizi*, Hendrik Nicolai, Matthias Koch, Stefan Pielsticker, Christian Hasse, Reinhold Kneer, Anna Maßmeyer *Institute of Heat and Mass Transfer, RWTH Aachen University, Germany</p>	<p>14 Coupling radiative properties with detailed char conversion kinetics <u>Matthias Koch*</u>, Stefan Pielsticker, David Tarlinski, Viktor Scherer, Reinhold Kneer *Institute of Heat and Mass Transfer, RWTH Aachen University, Germany</p>
<p>15 Exploring formation of N-containing pollutants in pyrrole counterflow diffusion flame Bingjie Chen, Sebastian Faller, Andrea Nobili, Matteo Pelucchi, <u>Heinz Pitsch*</u> *Institute for Combustion Technology, RWTH Aachen University, Germany</p>	<p>16 Particle dynamics within a high-velocity biomass-laden jet investigated by two-phase velocimetry at low to ultra-high repetition rates <u>Christopher Geschwindner*</u>, Katharina Westrup, Andreas Dreizler, Benjamin Böhm *Institute of Reactive Flows and Diagnostics, Technical University of Darmstadt, Germany</p>
<p>17 Experimental investigation of RDF combustion for the optimization of CFD simulations of oxy-fuel-fired cement kilns <u>Rafael Solana Gómez*</u>, Robin Streier, Stefan Pielsticker, Reinhold Kneer, Viktor Scherer *Institute of Heat and Mass Transfer, RWTH Aachen University, Germany</p>	<p>18 Fluidised bed gasification of tannery sludge aimed at energetic valorisation Francesca Di Lauro, Renata Migliaccio, Giovanna Ruoppolo, Marco Balsamo, <u>Fabio Montagnaro*</u>, Edoardo Imperiale, Daniela Caracciolo, Massimo Urciuol *Department of Chemical Sciences, University of Naples Federico II, Italy</p>
<p>19 CFD modelling of syngas combustion with CO2 dilution in a gas turbine model combustor <u>Nikolaos Papafilippou*</u>, Francesco Pignatelli, Arman Ahamed Subash, Muhammad Aqib Chishty, Rikard Gebart *Department of Engineering Sciences and Mathematics, Luleå University of Technology, Sweden</p>	<p>20 Flamelet modeling of soot formation in a laminar pulverized solid fuel flame <u>Xu Wen*</u>, Federica Ferraro, Hendrik Nicolai, Christian Hasse *Simulation of Reactive Thermo-Fluid Systems, Technical University of Darmstadt, Germany</p>

<p>21 Effects of pyrolysis reactors types on tannery fleshing waste the bioproducts compositions <u>Raouia Chagtm</u>*, Assia Maaoui, Francesca Cerciello, Aida Ben Hassen Trabelsi, Barbara Apicella, Ferdinando Stanzone, Renata Migliaccio, Maria Maddalena Oliano, Massimo Urciolo, Osvalda Senneca * Faculty of Sciences of Tunis, University of Tunis El Manar, Tunisia</p>	<p>22 H₂ storage capacities of HKUST-1/GRM hybrids Michela Alfe, <u>Valentina Gargiulo</u>*, Luciana Lisi, Alfonso Policicchio *Institute of Sciences and Technologies for Sustainable Energy and Mobility (STEMS)-CNR, Italy</p>
<p>23 Effect of oxidative atmospheres on the course and products of reconstituted tobacco thermochemical degradation <u>Renata Migliaccio</u>*, Osvalda Senneca, Maria Maddalena Oliano, Francesca Cerciello, Barbara Apicella, Giovanna Ruoppolo, Riccardo Chirone *Institute of Sciences and Technologies for Sustainable Energy and Mobility (STEMS)-CNR, Italy</p>	<p>24 Investigation of the release of nitrogen compounds during pyrolysis and oxidation of walnut shells in different atmospheres Marcel Richter, <u>Coskun Yildiz</u>*, Jochen Ströhle, Bernd Epple *Institute for Energy Systems and Technology, Technical University of Darmstadt, Germany</p>
<p>25 Mass transfer around freely moving active particles during fast heterogeneous chemical reaction in dense gas-fluidized bed <u>Laura Mollignano</u>*, Maurizio Troiano, Roberto Solimene, Sina Tebianian, Jean-François Joly, Fabrizio Scala, Piero Salatino *Department of Chemical, Materials and Industrial Production Engineering, University of Naples Federico II, Italy</p>	

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