

– Program –

Welcome address	
08:45	F. Sewerin <i>Emmy Noether Group for Dispersed Multiphase Flows, Otto von Guericke University Magdeburg, Germany</i>

Session on “ Cycle economy ” <i>Chair: J.M. Bergthorson</i>	
09:00	“Retrofit of district heating plants from biomass-fired combustors into iron redox systems – assessment of the Swedish case” D.C. Guío-Pérez, G. Martinez-Castilla, A. Toktarova, D. Pallarès <i>Division of Energy Technology, Department of Space, Earth and Environment, Chalmers University of Technology, Göteborg, Sweden</i>
09:15	“Thermodynamic assessment of iron as an energy carrier for carbon-free electricity generation” J. Neumann, F. Dammel, P. Stephan <i>Institute for Technical Thermodynamics, Department of Mechanical Engineering, Technical University of Darmstadt, Germany</i>
09:30	“Techno-economic analysis of aluminum, zinc and magnesium as potential clean energy carriers” P. Boudreau, J.M. Bergthorson <i>Alternative Fuels Laboratory, Department of Mechanical Engineering, McGill University, Montréal, Canada</i>
09:45	“Techno-economic analysis of iron fuel for energy storage and distribution” N. Pinkerton, S. Bowen-Bronet, J.M. Bergthorson <i>Alternative Fuels Laboratory, Department of Mechanical Engineering, McGill University, Montréal, Canada</i>

Session on “ Metal-water slurry reactors ” <i>Chair: J.M. Bergthorson</i>	
10:00	“Thermal ignition of micro-aluminum powder and with compressed water” T. Kirton, F. Saceleanu, M.R. Kholghy <i>Energy and Particle Technology Laboratory, Carleton University, Ottawa, Canada</i>

10:15	<p>“Fundamentals of high temperature liquid water and supercritical metal-water reactions” K. Trowell <i>Department of Mechanical Engineering, McMaster University, Hamilton, Canada</i></p>
Posters	1 and 2

Coffee break and posters from 10:30 to 11:15

<p>Session on “Single metal particle combustion” Chair: M. Schiemann</p>	
11:15	<p>“Detailed characterization of the combustion of an isolated aluminum particle” H. Keck^{1,2}, V. Glasziou^{1,3}, C. Chauveau¹, F. Halter¹ ¹<i>CNRS – ICARE, Orléans, France</i> ²<i>ArianeGroup, Vert-le-Petit, France</i> ³<i>CEA – DAM, Gramat, France</i></p>
11:30	<p>“Thermogravimetric study of the oxidation of iron particles” M. Kurnatowska, Q. Fradet, U. Riedel <i>Institut für CO₂-arme Industrieprozesse, Deutsches Zentrum für Luft- und Raumfahrt, Zittau, Germany</i></p>
11:45	<p>“Particle resolved hyperspectral pyrometry measurements of burning iron particles” J. Hameete, M.S. Abdallah, T.A.M. Homan, N.J. Dam, L.P.H. de Goey <i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i></p>
12:00	<p>“Towards iron-based alloy combustion: a parametric analysis” Z. Bruyr¹, L. Choisez¹, L. Thijs², X.C. Mi², P. Jacques¹, F. Contino¹ ¹<i>Institute of Mechanics, Materials and Civil Engineering (iMMC), Université catholique de Louvain (UCLouvain), Louvain-la-Neuve, Belgium</i> ²<i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i></p>
12:15	<p>“On the surface chemisorption of oxidizing fine iron particles: insights gained from molecular dynamics simulations” L.C. Thijs¹, E. Kritikos², A. Giusti², W.J.S Ramaekers¹, J.A. van Oijen¹, L.P.H de Goey¹, X.C. Mi¹ ¹<i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i> ²<i>Department of Mechanical Engineering, Imperial College London, United Kingdom</i></p>
Posters	3–8

Lunch break and posters from 12:30 to 14:00

<p>Session on “Laminar dust flames” <i>Chair: A. Scholtissek</i></p>	
14:00	<p>“Development of spectroscopic techniques to determine particle and gas-phase temperatures in premixed aluminum dust flames” K. Mangalvedhe¹, T. Yu¹, A. Durocher^{1,2}, J.M. Bergthorson¹ ¹<i>Department of Mechanical Engineering, McGill University, Montréal, Canada</i> ²<i>Gas Turbine Laboratory, National Research Council Canada</i></p>
14:15	<p>“Experimental investigation of the laminar reaction front speed of Fe-N₂/O₂ mixtures in a tube burner” M. Fedoryk, B. Stelzner, S. Harth, D. Trimis <i>Division of Combustion Technology, Engler-Bunte Institute, Karlsruhe Institute of Technology, Germany</i></p>
14:30	<p>“The essential role of reduced-gravity environment for the study of flames in fuel suspensions” J. Palecka, H. Heng, S. Goroshin, J.M. Bergthorson <i>Department of Mechanical Engineering, McGill University, Montréal, Canada</i></p>
14:45	<p>“Characterising iron powder combustion using a v-shaped flame” H. Prime, Y. Shoshyn, R.T.E. Hermanns, L.H.P. de Goey <i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i></p>
15:00	<p>“Numerical determination of laminar flame speeds with the counterflow twin-flame technique for dispersed fuels” C.E.A.G. van Gool, T. Hazenberg, J.A. van Oijen, L.P.H. de Goey <i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i></p>
15:15	<p>“Numerical simulation of iron-air suspensions: reaction zone structures and reaction front speed” D. Braig, J. Mich, B.-D. Nguyen, A. Scholtissek, C. Hasse <i>Simulation of reactive Thermo-Fluid Systems, Department of Mechanical Engineering, Technical University of Darmstadt, Germany</i></p>
Posters	9–13

Coffee break and posters from 15:30 to 16:30

<p>Session on “From the single particle level to turbulent dust flames” <i>Chair: F. Sewerin</i></p>
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16:30	<p>“In-situ optical investigations of metal powder oxidation on different combustion scales” T. Krenn, T. Li, J. Hebel, D. Ning, B. Böhm, A. Dreizler <i>Reactive Flows and Diagnostics, Department of Mechanical Engineering, Technical University of Darmstadt, Germany</i></p>
16:45	<p>“Slow combustion of spherical magnesium particles in a fluidized bed reactor: experiments and simulations” T. Wronski, A. Wittmann, C. Schönnenbeck, A. Brillard, J.-F. Brillhac, V. Tschamber <i>Université de Haute-Alsace, Mulhouse, France</i></p>
17:00	<p>“MgO and NO_x emissions from a swirled-stabilized Mg flame” A. Andrieu, J.-F. Brillhac, C. Schönnenbeck, G. Leysens, G. Trouvé, A. Brillard, V. Tschamber <i>Université de Haute-Alsace, Mulhouse, France</i></p>
Posters	14 and 15

Concluding remarks and farewell	
17:15	<p>M. Schiemann <i>Department of Energy Plant Technology, Ruhr University Bochum, Germany</i></p>

Poster sessions	
1	<p>“Effect of particle size distribution on thermal ignition criteria for aluminum and water batch reactions” F. Saceleanu, M.S. Mobarakeh, T. Kirton, M.R. Kholghy <i>Energy and Particle Technology Laboratory, Carleton University, Ottawa, Canada</i></p>
2	<p>“Investigating the role of particle morphology on the kinetics of the aluminum-water reaction based on a multi-stage shrinking core model” M.S. Mobarakeh, F. Saceleanu, M.R. Kholghy <i>Energy and Particle Technology Laboratory, Carleton University, Ottawa, Canada</i></p>
3	<p>“Iron particle ignition in hot coflow” M. Abdallah, Y. Shoshin, G. Finotello, L.P.H. de Goey <i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i></p>
4	<p>“Solid-phase oxidation time of single iron particle combustion in a hot laminar flow”</p>

	D. Ning, T. Li, B. Böhm, A. Dreizler <i>Reactive Flow and Diagnostics, Department of Mechanical Engineering, Technical University of Darmstadt, Germany</i>
5	“Comparing nanosecond and picosecond excitation for laser induced breakdown spectroscopy to determine the oxidation state of iron particles” M. Dorscht ^{1,2} , K. Koschnick ^{1,2} , B. Böhm ² , A. Dreizler ² , D. Geyer ¹ ¹ <i>University of Applied Sciences Darmstadt, Laboratory “Optical Diagnostics and Renewable Energies”, Germany</i> ² <i>Reactive Flow and Diagnostics, Department of Mechanical Engineering, Technical University Darmstadt, Germany</i>
6	“A contactless method for operando electrical conductivity measurements” P. Kraus <i>Emmy Noether Conductivity and Catalysis Lab, Institute of Material Science and Technology, Technical University of Berlin, Germany</i>
7	“Modelling of aluminum combustion in homogeneous reactors” J. Finke and F. Sewerin <i>Emmy Noether Group for Dispersed Multiphase Flows, Otto von Guericke University Magdeburg, Germany</i>
8	“Aluminum particle combustion: A combined PBE-CFD approach” J. Finke and F. Sewerin <i>Emmy Noether Group for Dispersed Multiphase Flows, Otto von Guericke University Magdeburg, Germany</i>
9	“Nitrogen oxide emissions in iron dust flames” T. Hazenberg, W.J.S. Ramaekers, L.C. Thijs, X.C. Mi, J.A. van Oijen, L.P.H. Goey <i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i>
10	“The heat flux method adapted for hybrid iron-methane-air flames” M.R. Hulsbos, R.T.E. Hermanns, R.J.M. Bastiaans, L.P.H. de Goey <i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i>
11	“Minimum explosive concentration of micron-sized aluminum-silicon powder mixtures” S. van Aken ¹ , N. Suzuki ² , R. Saeki ² , X.C. Mi ¹ , W. Kim ² ¹ <i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i> ² <i>Hiroshima University, Japan</i>

12	<p>“Numerical studies on flame propagation through iron dust suspensions in confinement” A. Fujinawa¹, X.C. Mi^{2,3} ¹<i>Cavendish Laboratory, Department of Physics, University of Cambridge, United Kingdom</i> ²<i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i> ³<i>Eindhoven Institute for Renewable Energy Systems, Eindhoven University of Technology, The Netherlands</i></p>
13	<p>“A population balance model for describing laminar aluminum dust flames” F. Sewerin and J. Finke <i>Emmy Noether Group for Dispersed Multiphase Flows, Otto von Guericke University Magdeburg, Germany</i></p>
14	<p>“Modelling turbulence interaction and the preferential concentration of reacting iron particles” S.S. Hemamalini^{1,2}, B. Cuenot^{1,3}, J. A. van Oijen¹, X.C. Mi^{1,2} ¹<i>Department of Mechanical Engineering, Eindhoven University of Technology, The Netherlands</i> ²<i>Eindhoven Institute of Renewable Energy Systems, Eindhoven University of Technology, The Netherlands</i> ³<i>CERFACS</i></p>
15	<p>“Enhanced size prediction of reduction reactors in a metal fuel cycle” L. Gossel¹, J. Neumann², M. Fricke¹, F. Dammel², P. Stephan², D. Bothe¹ ¹<i>Institute for Mathematical Modeling and Analysis, Technical University of Darmstadt, Germany</i> ²<i>Institute for Technical Thermodynamics, Technical University of Darmstadt, Germany</i></p>