



GHENT

PYRO 2022

Het Pand, Ghent, Belgium

15 - 20 May 2022
Final Program



www.pyro2022.org



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The 23rd edition of the International Conference on Analytical and Applied Pyrolysis is organised with the support of



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This program belongs to:



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Kevin Van Geem	Ghent University, Laboratory for Chemical Technology
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Guangwen Xu	Shenyang University of Chemical Technology, China
Güray Yildiz	Izmir Institute of Technology, Turkey



Dear Colleagues, Dear Friends,

The time has finally come to welcome you to the **23rd edition of the International Conference on Analytical and Applied Pyrolysis**, taking place both online and in Ghent, Belgium on 15-19 May 2022.

Delegates from academia, research institutes and industry are going to present their latest results and define the needs for future developments. This is done in sessions with oral and poster presentations, with ample opportunities for discussion.

We are honored to present a state-of-the-art program which includes topics varying from fundamental studies and advanced analytical techniques, up to pyrolysis applications in a commercial setting. The conference is not limited merely to applied biomass pyrolysis for renewable energy; it will also be dedicated for a significant part to the thermal decomposition of materials like coal, plastics, polymers, and composites. Products of pyrolysis can be used for (renewable) fuels and advanced materials; valuable green chemicals can be extracted or synthesized from them and, if properly characterized, they can lead to identification of the parent material.

It is the first time that Belgium is hosting the PYRO conference. Previous conferences were held in France (3), Germany (3), Spain (3), England (2), Austria (2), Hungary (2), Japan (2), The Netherlands (2), Italy (1) and Sweden (1). The latest editions held in Birmingham (2014), Nancy (2016) and Kyoto (2018) were chaired by Tony Bridgewater, Anthony Dufour and Hajime Ohtani respectively. Despite the COVID pandemic, which prevents many of our international, mainly Asian colleagues to travel to Ghent, we will welcome over 170 participants to Ghent. In addition, 55 colleagues will participate online.

The conference venue is magnificent: ‘Het Pand’, situated in the historical center of Ghent, is an ancient monastery (13th century) of the order of the Dominicans, which has been renovated completely. The University of Ghent is using it currently for academic meetings and the organization of symposia and congresses.

Your host institute, the University of Ghent, was founded in 1810. Over the past two centuries it has developed towards a highly-ranked academic society, with 11 faculties occupied by 15,000 staff and 44,000 students. The PYRO2022 conference organizers are working in the Department of Green Chemistry and Technology of the Bioscience Engineering Faculty, and at the Laboratory of Chemical Technology of the Faculty of Engineering and Architecture. Together, they have an extensive experience in pyrolysis research and built a significant network of international collaboration. All those who are coming in person will spend one week in the spectacular town of Ghent, to enjoy the presentation of new pyrolysis results in the first place, but also to establish collaborations by meeting new colleagues and seeing old friends again.

The organizers warmly welcome you all to PYRO2022!

Wolter Prins and Frederik Ronsse
PYRO 2022 Conference Chairs



Program Monday 16 May 2022

08.50 **Welcome**

Opening of the Conference

Wolter Prins, Conference Chair

09.10 **Keynote Lecture 1**

Chair: Wolter Prins, Ghent University, Belgium

The pyrolysis biorefinery: Opportunities and challenge

Erik Heeres, University of Groningen, The Netherlands

09.50 **Chemical recycling (pyrolysis) of plastics**

Anja Oasmaa, VTT Technical Research Centre of Finland Ltd., Espoo, Finland

10.10 **Analytical pyrolysis of polyethyleneimines**

Daniele Fabbri, University of Bologna, Italy

10.30 **Coffee Break**

Session 1A

Progress in analysis and analytical instrumentation

Chair: Frederik Ronsse, Ghent University, Belgium

11.00 **Determining microplastic content in environmental samples using a database software approach for identification and comparison of two different pyrolysis-GC/MS techniques**

Eike Kleine-Benne, Gerstel, Germany

11.20 **Weather-induced degradation studies of polymers using the photoprobe**

Karen Sam, CDS Analytical, USA

11.40 **Trace sample analysis by a splitless pyrolysis-GC/MS system coupled to a newly developed sampler**

Michael Soll, Frontier Laboratories Europe, Germany

Session 1B

Applied pyrolysis for recycling of polymers and plastics

Chair: Anja Oasmaa, VTT, Finland

11.00 **Chemical upcycling of waste plastics**

Ive Hermans, University of Wisconsin-Madison, USA

11.20 **Investigation of the effect of calcination on commercial ZSM-5 catalysts in the pyrolysis reaction of plastic waste**

Arango Ponton Paola, University Lille, France

11.40 **The importance of the reflux on the products composition during the pyrolysis of polypropylene in a semi batch reactor**

Hassibi Nabil, CNRS Nancy, France

12.00 **Lunch & Poster Session**

Program Monday 16 May 2022



13.30 **Keynote Lecture 2**

Chair: Daniele Fabbri, University of Bologna, Italy

Potential of pyrolytic synergistic interactions during co-pyrolysis of plastic, biomass, and petroleum

Shogo Kumagai, Tohoku University, Japan

Session 2A

Analytical pyrolysis / environment, cultural heritage, food, medical

Chair: Daniele Fabbri, University of Bologna, Italy

14.10 **Study on polyurethanes and their environmental occurrence in the analysis of microplastics by Py-GC-MS**

Irene Coralli, University of Bologna, Italy

14.30 **Slow pyrolysis of low-density polyethylene coated coffee cups into value-added products**

Heejin Lee, Western University, Canada

14.50 **Analytical pyrolysis assisted by chemometrics: A convenient approach to study complex organic matrices**

Nicasio Tomás Jiménez-Morillo, Hercules Laboratory University of Evora, Portugal

15.10 **Separate detection of high- and low-molecular weight components of amber with evolved gas analysis and multi-shot analytical pyrolysis-GC/MS**

Marco Mattonai, University of Pisa, Italy

15.30 **Identification of natural organic materials used in Chinese cultural relics by pyrolysis-gas Chromatography/mass spectrometry**

Na Wang, The Palace Museum, China

15.50 **End of Day 1**

16.00 **Guided City Tour (see page 32)**

Session 2B

Applied pyrolysis for recycling of polymers and plastics

Chair: Marion Carrier, CNRS Nancy, France

14.10 **Suitability of biochar produced from co-pyrolysis of spent growing media and plastic grow bags in environmental applications**

Frederik Ronsse, Ghent University, Belgium

14.30 **Intrinsic kinetics of polypropylene pyrolysis via Pulse-Heated Analysis of Solid Reactions (PHASR): Pyrolysis for circular plastic economy**

Nathan Sidhu, University of Minnesota – Twin Cities, USA

14.50 **Pyrolysis of waste plastic mixture from WEEE in a reactive distillation system**

Tiago Godinho, CERENA – IST, Portugal

15.10 **Chemical recycling of polystyrene to obtain styrene: Comparison between pyrolysis and hydrothermal liquefaction**

Sogand Musivand, Sapienza University of Rome, Italy

15.30 **Multitechnological recycling for polystyrene waste**

Muhammad Hassam Khan, VTT, Finland



Program Tuesday 17 May 2022

08.30 Keynote Lecture 3

Chair: Frederik Ronsse, Ghent University, Belgium

Strategies based on analytical pyrolysis for the study of organics from archaeological findings
Erika RIBECHINI, University of Pisa, Italy

Session 3

Analytical pyrolysis / environment, cultural heritage, food, medical
Chair: Frederik Ronsse, Ghent University, Belgium

09.10 Development of mass spectrometry search algorithm for mixed microplastics by Py-GC/MS

Michael Soll, Frontier Laboratories Europe, Germany

09.30 Influence of inorganic matrices on the analytical pyrolysis of poly(ethylene terephthalate) — Implications for microplastics analysis

Tim Lauschke, Federal Institute of Hydrology, Germany

09.50 Conversion and fractions yield of the roasting process of cocoa particles in a μ -reactor

Myriam Rojas, Universidad Nacional de Colombia, Colombia

10.10 Biochar stability scores from analytical pyrolysis (Py-GC-MS)

Stef Ghysels, Ghent University, Belgium

10.30 Coffee Break

Session 4

Analytical pyrolysis of coal, biomass, waste, polymers and plastics
Chair: Clemens Schwarzingner, Johannes Kepler University, Austria

11.00 Thermally assisted hydrolysis and methylation GC-MS modified for rigidly cross-linked acrylate copolymers

Hajime Ohtani, Nagoya Institute of Technology, Japan

11.20 Improved characterisation of olefins, sulfur and nitrogen containing components in plastic waste pyrolysis oils by comprehensive two-dimensional gas-chromatography coupled to multiple detectors

Kevin Van Geem, Ghent University, Belgium

11.40 Pyrolysis of residual lignocellulosic biomass in molten chloride salts: A Py-GC-MS study

Adriana Elena Estrada Leon, Ghent University, Belgium

12.00 Analytical pyrolysis of Chilean oak using natural and synthetic zeolites: A Py-GC/MS study

Serguei Alejandro-Martin, Universidad del Bio-Bio, Chile

12.20 Pulse-Heated Analysis of Solid Reactions (PHASR) to study intrinsic kinetics of polyethylene pyrolysis

Isaac Mastalski, University of Minnesota, USA

12.40 Lunch & Poster Session

14.00 Keynote Lecture 4

Chair: Patrice Perreault, University of Antwerp, Belgium

Pyrolysis of hydrocarbons and methane pyrolysis
Earl Goetheer, TNO, The Netherlands



Program Tuesday 17 May 2022

Session 5A

Analytical pyrolysis of coal, biomass, waste, polymers and plastics
Chair: Patrice Perreault, University of Antwerp, Belgium

14.40 Shale gas reserve estimation for the UK Bowland shale using high pressure water pyrolysis

Colin Snape, University of Nottingham, UK

15.00 Insights into mass transfer controlled radical induced co-pyrolysis of lignin and plastics

Yuyang Fan, Southeast University China

15.20 The effect of pressure on product formation during the co-pyrolysis of coal and torrefied biomass

Hein Neomagnus, North-West University, South Africa

15.40 Py-GC/MS can provide a wealth of useful information on the degradation of microplastics

Jacopo La Nasa, University of Pisa, Italy

16.00 Coffee Break

Session 6A

Analytical pyrolysis of coal, biomass, waste, polymers and plastics
Chair: Sascha Kersten, Demcon Suster BV, The Netherlands

16.30 Reaction pathways of cellulose fast pyrolysis in the presence of molten polymers

Hsi-Wu Wong, University of Massachusetts Lowell, USA

16.50 The use of boron-based additives for the prevention of char agglomerating and the preparation of boron-doped carbon microspheres during lignin pyrolysis

Zhiguo Dong, Huazhong University of Science and Technology, China

17.10 Co-pyrolysis of printed circuit boards and waste tire: Product characteristics and prediction

Chuan Ma, Tohoku University, Japan

17.30 Description of polymers and composite materials with thermal analysis hyphenated to photoionization mass spectrometry

Lukas Friederici, University of Rostock, Germany

Session 5B

Hydrothermal and solvent liquefaction; hydrothermal carbonization
Chair: Stef Ghysels, Ghent University, Belgium

14.40 Catalytic depolymerisation of lignin: UV fluorescence as a fast analysis method of monomers and oligomers

Anthony Dufour, CNRS Nancy, France

15.00 Evaluation of the char formation during the hydrothermal treatment of wood

Jens Pfersich, University of Hohenheim, Germany

15.20 Economic sustainability of hydrothermal liquefaction of sewage sludge: From a conceptual analysis to a practical verification

Claudia Prestigiacomo, University of Palermo, Italy

15.40 Role of hydrothermal liquefaction of algal biomass within the Sewage Treatment and Resource Recovery (STaRR) system

Catherine Brewer, New Mexico State University, USA

Session 6B

Product stabilization, separation, purification and (catalytic) upgrading
Chair: Hein Neomagus, North-West University, South Africa

16.30 Catalytic oxidative desulphurization of pyrolytic oils to fuels over different waste derived carbon-based catalysts

Mattia Bartoli, Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali, Italy

16.50 Fast pyrolysis bio-char as a support for Nb₂O₅ promoted catalysts for bio-oil upgrading via hydrodeoxygenation

Mariana M. Campos Fraga, Institute of Catalysis Research and Technology

17.10 Hydroprocessing of scrap tyres pyrolysis oil

Miloš Auersvald, University of Chemistry and Technology Prague, Czech Republic

17.30 Coproducts from catalytic fast pyrolysis enable cost-effective biofuels

Mark Nimlos, National Renewable Energy Laboratory, USA

18.00 Poster Session and Happy Hour (See page 32)

19.30 End of Day 2



Program Wednesday 18 May 2022

08.30 Keynote Lecture 5

Chair: Erik Heeres, University of Groningen, The Netherlands

Catalytic hydropyrolysis of biomass for green fuels
Magnus Zingler Stummann, Haldor Topsoe, Denmark

Session 7

Analytical pyrolysis of coal, biomass, waste, polymers and plastics & Analytical and applied catalytic (hydro) pyrolysis

Chair: Erik Heeres, University of Groningen, The Netherlands

09.10 Fast pyrolysis of polymers: Analysis of the primary reactions

Dwiputra Zairin, University of Twente, The Netherlands

09.30 Effect of chitosan incorporation on the pyrolysis of cellulose fiber for carbon fiber production

Hilda Rizkia Zahra, Aalto University, Finland

09.50 Radical footprinting and regularity revealing during the pyrolysis of technical lignins

Chao Liu, Southeast University, China

10.10 Coffee Break

Session 8A

Reaction mechanisms and kinetics / modelling and experimentation

Chair: Anthony Dufour, CNRS Nancy, France

Session 8B

Product characterization and utilization

Chair: Ondrej Masek, University of Edinburgh, UK

10.40 Steam cracking of methyl esters: a modeling study on the influence of the hydrocarbon backbone

Florence Vermeire, Ghent University, Belgium

11.00 Exploring chemistry of waste polymer pyrolysis with automatic fragment modeling

Yen-Ting Wang, Massachusetts Institute of Technology, USA

11.20 International round robin for assessing the reliability of kinetics in biomass pyrolysis TGA

Andres Anca-Couce, TU Graz, Austria

11.40 A lumped kinetic approach for polystyrene pyrolysis

Andrea Locaspi, Politecnico di Milano, Italy

12.00 Experimental study of the influence of temperature and particle's aspect ratio on the products of single beech wood cylinder pyrolysis

Przemyslaw Maziarka, Ghent University, Belgium

10.40 Physical activation in one and two steps of wheat straw-derived biochar for biogas upgrading via CO₂ adsorption

Joan Manyà, Aragon Institute of Engineering Research, Spain

11.00 Straw bio-oil does not only contain oxygenates

Miloš Auersvald, University of Chemistry and Technology Prague, Czech Republic

11.20 Investigation of the properties and reactivity of biocarbon at high temperature in mixture of CO/CO₂

Liang Wang, SINTEF Energy Research, Norway

11.40 Intermediate pyrolysis of agricultural and residual lignocellulosic feedstocks for biochar, biofuels intermediate and biochemicals production

Giacomo Lombardi, RE-CORD, Italy

12.00 Effect of different reaction environment on PETs behavior during contaminated biomass pyrolysis

Corinna Maria Grottola, STEMS-CNR, Italy

12.20 Lunch & Poster Session

14.00 Keynote Lecture 6

Chair: Kevin Van Geem, Ghent University, Belgium

How can quantum chemistry and complex chemical kinetic models help us understand and improve pyrolysis?

William 'Bill' Green, Massachusetts Institute of Technology, USA

Program Wednesday 18 May 2022

Session 9A

Reaction mechanisms and kinetics / modelling and experimentation

Chair: Florence Vermeire, Ghent University, Belgium

Session 9B

Product characterization and utilization

Chair: Robert Carleer, University Hasselt, Belgium

14.40 Kinetical and microstructural modeling of HDPE and LLDPE: A technique to evaluate the influence of impurities originating from chemically recycled post-consumer plastic waste.

Daniel Pernusch, Johannes Kepler University, Austria

15.00 Benzene-ring formation via 5-HMF as a key intermediate in cellulose carbonization

Nomura Takashi, Kyoto University, Japan

15.20 Density functional theory to identify structures of dehydrated sugars obtained by biomass pyrolysis

Melba Denson, Washington State University, USA

15.40 Catalytic fast pyrolysis on H-ZSM-5 zeolite: Steady-state activity during anisole transformation

Nathan Pichot, Université de Poitiers, France

14.40 Formation pathways and adsorption mechanisms of red mud-biomass pyrolytic composites with magnetic properties

Griffin Loeb sack, Western University, Canada

15.00 Development and comparison of two online viscosity measurement systems for fast pyrolysis bio-oil

Axel Funke, Karlsruhe Institute of Technology, Germany

15.20 Role of mineral additives in modification of biochar properties and its carbon sequestration potential

Ondrej Masek, University of Edinburgh, UK

15.40 Characterisation of microalgal HTL bio-crudes and fast pyrolysis liquids by NMR spectroscopy

Daniel Nowakowski, Aston University, UK

16.00 Coffee Break

Session 10A

Applied pyrolysis of coal, biomass and waste: Bench scale testing

Chair: Franco Berruti, Western University, Canada

Session 10B

Product characterization and utilization Techno-economic and environmental assessments

Chair: Dries Vandamme, University Hasselt, Belgium

16.30 Co-pyrolysis of microalgae and glucose: Nitrogen evolution and incorporation in biochar

Willem Vercruyssen, Hasselt University, Belgium

16.50 Fine structural change of fluid catalytic cracking catalysts study incorporate with coke characterization formed in heavy oil volatilization/decomposition

Ye Shui Zhang, University of Aberdeen, UK

17.10 Ex-situ catalytic pyrolysis of glycerol to bio-based BTX over a H-ZSM-5(23) zeolite catalyst

Erik Heeres, University of Groningen, The Netherlands

17.30 Value-added products from the pyrolysis of real-world waste materials

Sadegh Papari, Western University, Canada

16.30 Comparison of microalgae derived biochar and hydrochar – Product properties and environmental impact

Jiacheng Sun, University of Edinburgh, UK

16.50 The legal status of pyrolysis plants and pyrolysis of biomass waste in the Industrial Emissions Directive

Elisa Cavallin, Hasselt University, Belgium

17.10 Partial pyrolysis of surplus logging residues – A feasibility assessment for northern Sweden

David Agar, Swedish University of Agricultural Sciences, Sweden

17.30 FCC co-processing of fast pyrolysis bio-oil: Impact of green carbon tracking methods on the LCA

Tijs Lammens, BTG Bioliquids, The Netherlands

17.50 End of Day 3

19.00 Conference Dinner at Oude Vismijn (see page 32)

The poster prizes - offered by Frontier Lab - will be announced in the Award Ceremony during the Conference Dinner.





Program Thursday 19 May 2022

08.30 **Keynote 7 Lecture:**
Chair: Frederik Ronsse, Ghent University, Belgium
Pyrolysis of biomass to valuable compounds
Qiang Lu, North China Electric Power University, China

09.10 **Application of micro fluidized bed in gas-solid thermal reaction analysis**
Guangwen Xu, Shenyang University of Technology, China

Session 11A

Applied pyrolysis of coal, biomass and waste: Bench scale testing
Chair: Axel Funke, Karlsruhe Institute of Technology, Germany

09.40 **Fuel suitability of fast pyrolysis bio-oils from citric acid-leached sugarcane residues**
Frederik Ronsse, UGent, Belgium

10.00 **Fermentable sugars obtainment through pyrolysis and hydrolysis of water-soluble pyrolysis products over solid acid catalyst**
Andrea Facchin, University of Bologna, Italy

10.20 **Effect of process conditions during slow pyrolysis of pinewood in a molten eutectic mixture of chloride salts**
Jonas De Smedt, Ghent University, Belgium

Session 11B

Analytical and applied catalytic (hydro) pyrolysis
Chair: Angelos Lappas, Centre for Research and Technology Hellas, Greece

09.40 **Thermal conversion of inedible vegetable oils to aromatics**
Sarah Asplin, Aston University, UK

10.00 **Thermogravimetric studies and kinetic modeling of the pyrolysis of polyurethane plastics**
Michael Zeller, Karlsruhe Institute of Technology, Germany

10.20 **Activated carbons from fast pyrolysis biochar as novel catalysts for the post-treatment of pyrolysis vapors, studied by analytical pyrolysis**
Taina Ohra-aho, VTT Technical Research Centre, Finland

10.40 **Coffee Break**

Session 12A

Applied pyrolysis of coal, biomass and waste: Bench scale testing
Chair: Liang Wang, SINTEF Energy Research, Norway

11.10 **Effect of biomass type on the pyrolysis and in line catalytic steam reforming for hydrogen production**
Enara Fernandez Saenz, University of the Basque Country, Spain

11.30 **Catalytic pyrolysis of end-of-life tyres: Effect of catalyst type on the production of highly aromatic oils**
Stelios Stefanidis, Chemical Process and Energy Resources Institute (CPERI), Greece

11.50 **A comparative study on the effect of slow pyrolysis temperature on softwood and hardwood pyrolysis products yields and biochar properties**
Liang Wang, SINTEF Energy Research, Norway

12.10 **Lunch**



Program Thursday 19 May 2022

13.30 **Keynote Lecture 8**
Chair: Wolter Prins, Ghent University, Belgium
History of biomass fast pyrolysis
Robbie Venderbosch, BTG Biomass Technology Group, The Netherlands

Session 13

Applied pyrolysis of coal, biomass and waste: PDU and large scale operation
Chair: Wolter Prins, Ghent University, Belgium

14.00 **A critical review of catalytic fast pyrolysis of biogenic and polymeric solid waste in continuously operated units**

Güray Yildiz, Izmir Institute of Technology, Turkey

14.20 **The production and characterization of biochar for targeted (agricultural) applications**
Amine Lataf, University of Hasselt, Belgium

14.40 **Operational experience with miscanthus feedstock at the bioliq® fast pyrolysis plant**
Andreas Niebel, Karlsruhe Institute of Technology, Germany

15.00 **Pilot and demo plants for biochemicals and biofuels processes: Scaling up step by step**
Thomas Ladrak, Zeton, The Netherlands

15.25 **From biomass to bioliquids – Fast pyrolysis bio-oil**
Gerhard Muggen, BTG, The Netherlands

15.50 **Closing Session – Presentation of the next conference - Farewell**
Frederik Ronsse, Conference Chair

16.10 **End of Day 4**

Session 12B

Reaction mechanisms and kinetics/modelling and experimentation
Chair: Daniel Nowakowski, Aston University, UK

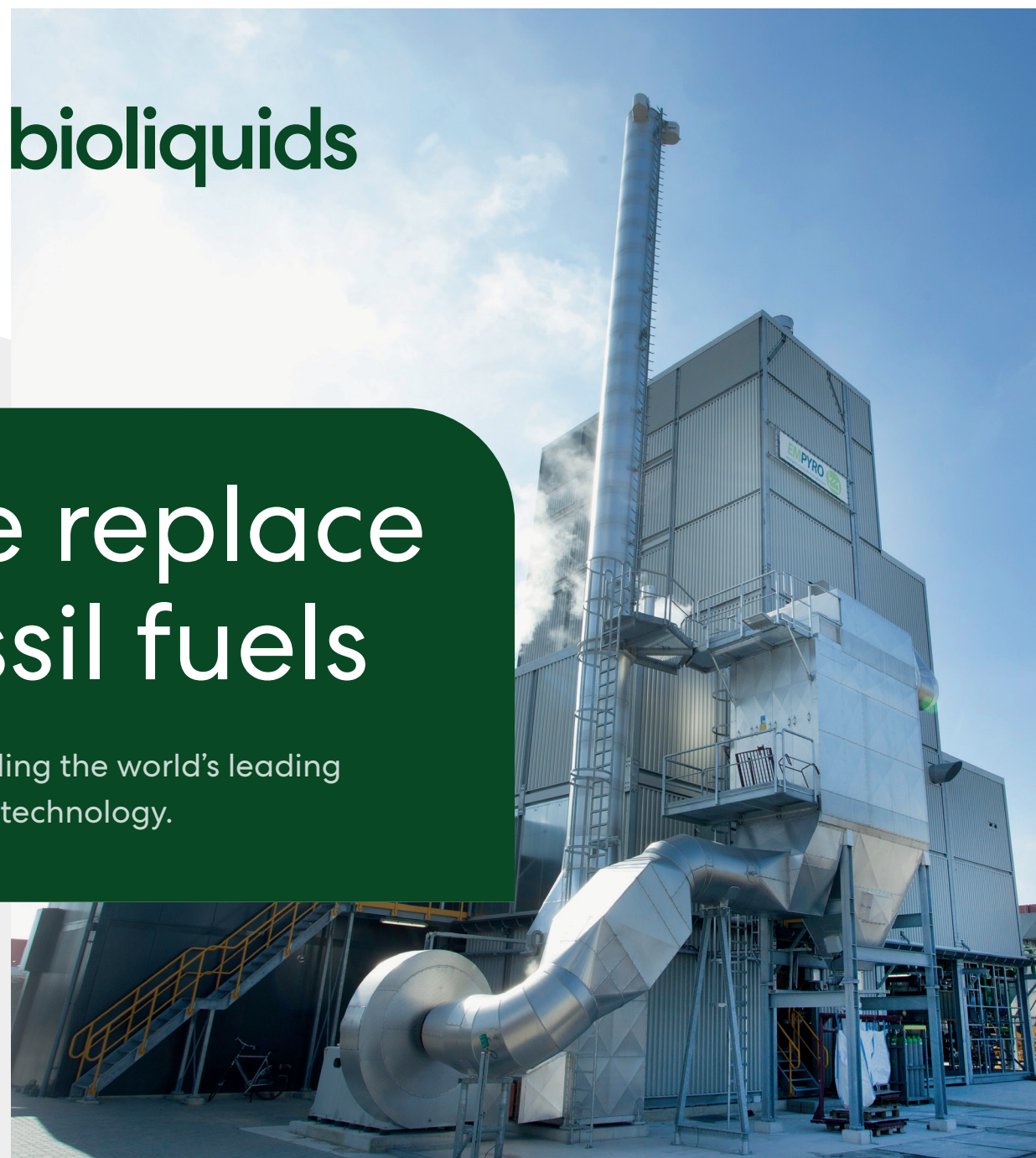
11.10 **Effect of metal cluster sizes, catalyst support and ring substituents on the Pd-catalyzed amination of lignin-derived phenolics**
Luis Arteaga, University of Bio-Bio, Chile

11.30 **Pyrolysis mechanism of lipid, protein and carbohydrate extracted from microalgae**
Qi Niu, Ghent University, Belgium

11.50 **A model for the mechanism and kinetics of hemicellulose pyrolysis**
Stephen Dooley, University of Dublin, Ireland

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Poster List





Topic 01. Progress in analysis and analytical instrumentation

- P1 Pyrolysis-GC/MS of biomass in a steam environment**
Sam K., Tank R.
CDS Analytical, Oxford, PA, USA
- P2 Integrated qualitative analysis of polymer sample by pyrolysis - gas chromatography combined high-resolution mass spectrometry: Using accurate mass measurement results both electron ionization and soft ionization**
Ubukata M., Kubo A., Nagatomo K.
JEOL Ltd., Tokyo, Japan
- P3 TG-HRTOFMS applications for polymers and additives: Accurate mass measurement using high resolution mass spectrometry**
Ubukata M.¹, Sato K.²
¹Jeol Ltd., Tokyo; ²Netzsch Japan K.K., Yokohama, Japan
- P4 Thermal analysis ultra-high resolution mass spectrometry for the chemical description of heavy petroleum fractions — bitumen and asphaltenes**
Rüger C.P.¹, Neumann A.¹, Käfer U.², Lacroix Andrivet O.³, Sklorz M.², Gröger T.², Streibel T.^{1,2}, Afonso C.³, Zimmermann R.^{1,2}
¹University of Rostock, Institute of Chemistry, Division of Analytical and Technical Chemistry, Organisation, Rostock; ²Helmholtz Zentrum München — German Research Center for Environmental Health, Cooperation Group of Comprehensive Molecular Analysis, Neuherberg, Germany; ³University of Rouen-Normandy, Rouen, France
- P5 Development and comparison of various methods for quantification of saccharides in pyrolysis bio-oils**
Kejla L.¹, Auersvald M.¹, Schulzke T.², Šimáček P.²
¹Dept. of Petroleum Technology and Alternative Fuels, University of Chemistry and Technology, Prague, Czech Republic; ²Fraunhofer-Institute for Environmental, Safety, and Energy Technology (UMSICHT), Oberhausen, Germany
- P6 Application of the Sealed pipe pyrolysis recovery method to lacquer film**
Nagano T., Honda T.
Graduate School of Science and Technology of Meiji Univ, Tama-ku, Kawasaki-shi, Japan

Topic 02. Analytical pyrolysis / environment, cultural heritage, food, medical

- P7 Determination of the fatty acid distribution in vegetable oils directly from seeds with thermally assisted hydrolysis and methylation**
Schwarzinger B.^{1,2}, Schwarzinger C.³
¹University of Applied Sciences Upper Austria, Wels; ²Austrian Competence Center for Feed and Food Quality, Safety and Innovation, Wels; ³Institute for Chemical Technology of Organic Materials, Johannes Kepler University, Linz, Austria
- P8 Global carbon sequestration in peat-moss ecosystems under a changing climate**
Abbott G.D.
School of Natural and Environmental Sciences, Drummond Building, Newcastle University, Newcastle upon Tyne, UK
- P9 Analytical pyrolysis as a fundamental technique for the identification-characterization of Asian lacquers in cultural heritage objects**
Pintus V.¹, Miklin-Kniefacz S.², Gassmann P.³, Jordan C.⁴, Schreiner M.¹
¹Institute of Science and Technology in Art, Academy of Fine Arts Vienna, Vienna; ²Vienna; ³Institute for Conservation-Restoration, Academy of Fine Arts Vienna, Vienna; ⁴Dept. of Conservation, Welt Museum Wien (WMW), Vienna, Austria

- P10 Aerospace technology as part of our heritage: Characterization of aircraft materials and study of their degradation processes by analytical pyrolysis**
La Nasa J.^{1,2}, Blaensdorf C.^{3,4}, Dolcher E.¹, Del Seppia S.¹, Ducoli R.¹, Lucejko J.^{1,5}, Micheluz A.⁴, Modugno F.^{1,5}, Capra N.⁶, Giovannini L.⁶, Tomasi M.L.⁶, Pamplona M.⁴, Colombini M.P.^{1,5}, Degano I.^{1,5}, Bonaduce I.^{1,5}
¹Dept. of Chemistry and Industrial Chemistry, University of Pisa, Pisa; ²National Interuniversity Consortium of Materials Science and Technology, Florence, Italy; ³Archäologische Staatssammlung, München; ⁴Deutsches Museum, München, Germany; ⁵Center for the Integration of Scientific Instruments of the University of Pisa (CISUP), University of Pisa, Pisa; ⁶Soprintendenza per i beni culturali della provincia autonoma di Trento, Italy
- P11 Development and test of a new mixture of reference polymers bound to silica particles for calibration and quantitative analysis of microplastics by Py-GC-MS**
Mattonai M.¹, Iwai I.², Ishimura T.², Watanabe C.², Teramae N.³
¹University of Pisa, Dept. of Chemistry and Industrial Chemistry, Pisa, Italy; ²Frontier Laboratories Ltd., Koriyama, Fukushima; ³Graduate School of Science, Tohoku University, Dept. of Chemistry, Sendai, Japan
- P12 Pyrolysis-gas chromatography-mass spectrometry and microspectroscopy to detect micro- and nanoplastics in marine sponges**
Biale G.¹, Saliu F.², Raguso C.², La Nasa J.¹, Degano I.^{1,3}, Seveso D.^{2,4}, Galli P.^{2,4}, Lasagni M.², Modugno F.^{1,3}
¹Dept. of Chemistry and Industrial Chemistry, University of Pisa, Pisa; ²Earth and Environmental Science Dept., University of Milano Bicocca, Milano; ³Center for Instrument Sharing of the University of Pisa (CISUP), University of Pisa, Pisa, Italy; ⁴MarHE Center (Marine Research and High Education Center) Magoodhoo Island Faafu Atoll, Republic of Maldives
- P13 Archaeological waterlogged wood from two archaeological sites: Investigations and comparison**
Lucejko J.J.¹, Marchi F.¹, Mattonai M.¹, Zborowska M.², Dąbrowski H.P.³, Fejfer M.³, Modugno F.¹, M.P. Colombini¹, Ribechini E.¹
¹Dept. of Chemistry and Industrial Chemistry, University of Pisa, Italy; ²Poznan University of Life Science, Poznan; ³Archaeological Museum in Biskupin, Biskupin, Poland
- P14 Step-by-step evaluation of matrix effect and sample recovery during pretreatment of wastewater samples for the quali-quantitation of microplastics by Py-GC-MS**
Lykkemark J.¹, Mattonai M.², Vianello A.¹, Vollertsen J.^{1,3}, Modugno F.^{2,3}
¹Aalborg University, Dept. of the Built Environment, Aalborg, Denmark; ²University of Pisa, Dept. of Chemistry and Industrial Chemistry, Pisa, Italy; ³North Atlantic Microplastic Centre (NAMC), Bergen, Norway
- P15 Direct evaluation of organic components in soil and lake sediments using a multi-shot pyrolyzer and thermal desorption GCMS**
 Chu X.^{1,2}, Fuse Y.¹, Fujitake N.³, Hayakawa K.⁴, Kudo Y.², Aono A.²
¹Graduate School of Science and Technology, Kyoto Institute of Technology, Kyoto; ²Shimadzu Corporation, Kyoto; ³Graduate School of Agricultural Science, Kobe University, Kobe; ⁴Lake Biwa Environmental Research Institute, Otsu, Japan
- P16 Chemical characterization of peat by EGA-MS and multi-step Py-GC/MS methods**
 Fuse Y.¹, Chu X.^{1,2}, Takeda N.¹, Fujitake N.³
¹Graduate School of Science and Technology, Kyoto Institute of Technology, Kyoto; ²Shimadzu Cooperation, Kyoto; ³Graduate School of Agricultural Science Faculty of Agriculture, Kobe University, Japan

Topic 03. Analytical pyrolysis of coal, biomass, waste, polymers and plastics

- P17 Characterization of polymers by hyphenating pyrolysis with GPC-MS**
Tudela E., Otte B., Konig A., Hagenhoff S., Pursch M.
¹Dow Benelux B.V., Analytical Science, Terneuzen, The Netherlands; ²Dow Stade Produktions GmbH & Co. OHG, Analytical Science, Stade, Germany
- P18 Micropyrolysis study to evaluation the potential for add-value to residual biomass from coffee beans after supercritical fluid extraction process**
Silva W.R.¹, Couto J.A.², Cardozo-Filho L.², Wisniewski Jr. A.¹
¹Petroleum and Energy from Biomass Research Group (PEB), Chemistry Dept., Federal University of Sergipe (UFS), São Cristóvão – Sergipe; ²Chemical Engineering Dept., Estadual University of Maringá (UEM), Maringá-Paraná, Brazil
- P19 Analytical pyrolysis to study the synergistic effects of the co-pyrolysis of biomass and plastic**
Nardella F., Mattonai M., Bellavia S., Ribechini E.
Dept. of Chemistry and Industrial Chemistry, University of Pisa, Pisa, Italy
- P20 Analysis of sulfonated polyesters via pyrolysis-GC/MS and TGA Methods**
Saller K., Schwarzwinger C.
Institute for Chemical Technology of Organic Materials, Johannes Kepler University, Linz, Austria
- P21 Pyrolysis mechanisms of cyclopentenones revealed via matrix-isolation FTIR and computations**
McCunn L.R.¹, Narkin K.M.¹, Legg H.N.¹, Martin T.D.¹, Brown G.J.¹, Hill D.L.¹, Parish C.A.²
¹Dept. of Chemistry, Marshall University, Huntington, West Virginia; ²Dept. of Chemistry, University of Richmond, Richmond, Virginia, USA
- P22 Flash pyrolysis behaviour for rocket fuels by Py-IA/MS with a skimmer interface**
Ayana B.¹, Yutaka W.¹, Yuji M.², Takahisa T.³, Nobuji K.⁴, Keiichi H.⁵, Ryo N.¹
¹Dept. of Engineering, Chiba Institute of Technology, Narashino; ²Kobe Material Testing Laboratory Co., Ltd., Ot; ³The National Institute of Advanced Industrial Science and Technology, Tsukuba; ⁴Katazen Corporation, Obu; ⁵ISAS/JAXA, Sagamihara, Japan
- P23 Pyrolysis and pressure: New insights based on fixed bed experiments**
Noumis E.S., Bounaceur A., Dufour A., Mauviel G.
LRGP, CNRS, Nancy, France
- P24 Catalytic influence of metal sulfates on the pyrolysis of a hydrothermally derived solid model fuel in N₂ and CO₂**
Eckhard T., Böttger J., Pflieger C., Muhler M., Cerciello F.
Ruhr-University Bochum, Laboratory of Industrial Chemistry, Bochum, Germany
- P25 Production of enhanced pyrolysis oil through co-pyrolysis of biomass and plastic waste in a semi-continuous reactor**
Jaafar Y.^{1,2}, Abdelouahed L.¹, El Hage R.², El Samrani A.², Taouk B.¹
¹Normandie Univ, INSA Rouen Normandie, UNIROUEN, Laboratoire de Sécurité des Procédés Chimiques, LSPC EA-4704, Rouen, France ; ²Lebanese University, EDST, Plateforme de Recherche en Nano Sciences et Nano Technologie (PR2N), Fanar, Lebanon
- P26 Thermal and catalytic pyrolysis of date palm seeds by Py-GC/MS**
Arabiourrutia M.¹, Bensidhom G.², Bolaños M.¹, Ben Hassen A.², Olazar M.¹
¹Dept. of Chemical Engineering, University of the Basque Country UPV/EHU, Bilbao, Spain, ²Centre de Recherches et des Technologies de l'Energie Technopole De Borj-C'edria, Hamam Lif Ben Arous, Tunisia
- P27 Using tungstophosphoric acid (H₃PW₁₂O₄₀) immobilized on Ce₂O₃, TiO₂ and SiO₂ to produce BTEX and p-cymene via waste tire pyrolysis**
Osorio-Vargas P.¹, Pizzio L.¹, Medina F.², Lick I.D.¹, Casella M.L.¹, Arteaga-Pérez L.E.²
¹Centro de Investigación y Desarrollo en Ciencias Aplicadas “Dr. J.J. Ronco” (CINDECA), Departamento de Química, Facultad de Ciencias Exactas, UNLP-CCT La Plata, CONICET, La Plata, Buenos Aires, Argentina, ²Laboratory of Thermal and Catalytic Processes. Wood Eng. Dept., University of Bio-Bio, Concepción, Chile



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¹Unit of Technology of Fuels, RWTH Aachen University, Aachen, Germany; ²Sintef Energy Research, Trondheim, Norway
- P29 Non-isothermal kinetic study of cocoa bean shell pyrolysis by thermogravimetric analysis**
Rojas M.^{1,2}, Ruano D.², Orrego-Restrepo E.¹, Chejne F.¹
¹Alliance for Biomass and Sustainability Research – ABISURE, Universidad Nacional de Colombia, Campus, Robledo, Medellín; ²IN3 Corporation, Pasto, Colombia
- P30 Catalytic co-pyrolysis of woody biomass with waste plastics: Effect of HZSM-5 and pyrolysis temperature on the pyrolytic products**
Jin X., Choi J.W.
Graduate School of International Agricultural Technology (GSIAT), Seoul National University, Pyeongchang, Gangwon, Republic of Korea
- P31 Kinetic and thermodynamic studies on co-pyrolysis of mahua deoiled seed cake and plastic waste using thermogravimetric analysis**
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Srivastava I., Yadav R., Mishra A., Pandey A.K., Rathore A.K.
Dept. of Chemical Engineering, Harcourt Butler Technological University Kanpur, Uttar Pradesh, India
- P32 Determination of products from the pyrolysis of balsa wood and sugar cane residues**
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¹Chemical Engineering, Central University of Ecuador, Quito, Ecuador; ²Dept. of Chemical Engineering, University of Alicante, Alicante, Spain
- P33 Fast pyrolysis of Ecuadorian residual biomasses**
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¹Universidad San Francisco de Quito USFQ, Departamento de Ingeniería Química, Instituto de Desarrollo de Energías y Materiales Alternativos IDEMA, Quito, Ecuador; ²Ghent University, Laboratory for Chemical Technology, Gent, Belgium
- P34 Pyrolysis of Klason lignins extracted from forestry residues**
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¹CERENA, Instituto Superior Técnico, Lisboa; ²Centro de Estudos Florestais, Instituto Superior de Agronomia, Lisboa, Portugal
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INSA Rouen Normandie, UNIROUEN, Laboratoire de sécurité des procédés chimiques (LSPC EA 4704), Rouen, France
- P36 Characterization of beach plastic wastes by analytical py- gc/ms**
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Pal S.K., Vinu R.
Dept. of Chemical Engineering & National Center for Combustion Research and Development Indian Institute of Technology Madras, Chennai, India
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Dpto. de Tecnologías para la Transición Energética, Instituto de Ciencia y Tecnología del Carbono (INCAR-CSIC), Oviedo, Spain
- P38 The possibility of predicting CRI/CSR of metallurgical coke using cokes prepared at laboratory scale (80 g)**
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Vega M.F., Díaz-Faes E., Barriocanal C.
Dpto. de Tecnologías para la Transición Energética, Instituto de Ciencia y Tecnología del Carbono (INCAR-CSIC), Oviedo, Spain
- P39 Study on pyrolysis behavior of polymeric coated aluminium scrap using TGA and Py-GC/MS**
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Vichaphund S., Wimuktiwan P., Soongprasit C., Soongprasit K., Phetchchai S., Sirichaivethkul R., Atong D.
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Alejandro-Martín S.^{1,2}, Medina Jofré F.²

¹Wood Engineering Dept., Fac. of Engineering, Universidad del Bío-Bío (UBB), Concepción.; ²Laboratory of Gas Chromatography and Analytical Pyrolysis (LGCAP), UBB, Concepción, Chile

Topic 04. Analytical and applied catalytic (hydro) pyrolysis

P41 Vapor phase upgrading from biomass hydrolysis in chloride molten salts

Estrada A., Ghysels S., Guedes T., Prins W., Ronsse F.

Thermochemical Conversion of Biomass Research Group, Dept. of Green Chemistry and Technology, Ghent University, Ghent, Belgium

P42 Enhanced syngas production from waste lubricant oil reforming with transition metal catalysts

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Nisamaneen J.¹, Atong D.², Sricharoenchaikul V.¹

¹Dept. of Environment Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok; ²National Metal and Materials Technology Center, Thailand Science Park, Pathumthani, Thailand

Topic 05. Reaction mechanisms and kinetics / modelling and experimentation

P43 Understanding the role of the structure and chemical composition on the pyrolysis of xylan-based hemicelluloses

Gargiulo V.¹, Ferreiro A.I.², Giudicianni P.¹, Tomaselli S.³, Rabaçal M.⁴, Costa M.², Ragucci R.¹, Alfè M.¹

¹IRC, CNR, Naples, Italy; ²IDMEC, IST, Universidade de Lisboa, Lisboa, Portugal; ³SCITEC, CNR, Milan, Italy; ⁴Aerothermochemistry and Combustion Systems Laboratory, ETH Zürich, Zürich, Switzerland

P44 Kinetic and thermodynamic assessment of lignin and lignocellulosic biomass pyrolysis

Cherukkattu Manayil J., Siu R.H.M., Bridgwater A.V., Nowakowski D.J.

Aston University, Energy and Bioproducts Research Institute, Birmingham, United Kingdom

P45 Prediction accuracy in modelling beech wood pyrolysis at different temperatures using a comprehensive, CFD-based single particle pyrolysis model

Maziarka P.¹, Sommersacher P.², Retschitzegger S.², Anca-Couce A.³, Ronsse F.¹

¹Dept. of Green Chemistry and Technology, Ghent University, Ghent, Belgium; ²BEST – Bioenergy and Sustainable Technologies GmbH, Graz; ³Graz University of Technology, Institute of Thermal Engineering, Graz, Austria

P46 Disclosing the thermal reactions of aliphatic amines in the presence of TiO₂ nanoparticles by multi-shot analytical pyrolysis

Komárková B.^{1,2}, Mattonai M.³, Degano I.^{3,4}, Slovák V.²

¹Institute of Inorganic Chemistry of the Czech Academy of Sciences, Husinec-Řež; ²University of Ostrava, Dept. of Chemistry, Ostrava, Czech Republic; ³Dept. of Chemistry and Industrial Chemistry, University of Pisa, Pisa; ⁴Center for Instrument Sharing of the University of Pisa (CISUP), University of Pisa, Italy

P47 Experimental and kinetic modeling study on the influence of nitrogen-containing impurities in steam cracking feedstocks

Vermeire F.H., Pappijn C.A.R., Bojković A., Van Geem K.M.

Laboratory for Chemical Technology (LCT), Ghent University, Ghent, Belgium

P48 Numerical model of fuel oil gasification

Guida P., Canciani C., Ceschin A., Guo J., Gubba S.R., Saxena S., Im H.G., Roberts W.L.

CCRC, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

P49 Lumped kinetic model for HFOs pyrolysis

Colleoni E.¹, Guida P.¹, Saxena S.¹, Frassoldati A.², Roberts W.L.¹, Faravelli T.²

¹Clean Combustion Research Center, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia; ²Dept. of Chemistry, Materials and Chemical Engineering "G. Natta", Politecnico di Milano, Milano, Italy

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P50 Development of a Reactor Network Model (RNM) for thermochemical conversion of contaminated biomass
Vandevelde R.¹, Vanierschot M.², De Greef J.¹
¹ChEMaRTS, Dept. of Materials Engineering, Leuven Group T Campus, KU Leuven; ²AFAA, Dept. of Mechanical Engineering, Leuven Group T Campus, KU Leuven, Belgium

P51 Development of a mechanistic kinetic model for the thermal pyrolysis of plastic from WEEE
Kol de Carvalho R., Rijo B., Lemos F., Lemos, M.A.N.D.A.
CERENA, Chemical Engineering Dept., Instituto Superior Técnico, Universidade de Lisboa, Lisboa, Portugal

P52 Investigation of heat transfer limitations in the Micropyrolyzer during biomass fast pyrolysis
Nasfi M., Carrier M., Salvador S.
RAPSOEE, CNRS UMR 5203, Université de Toulouse, IMT Mines Albi, Campus Jarlard, Albi, France

P53 Theoretical study on the mechanism of sulfur migration to gas in the pyrolysis of benzo-thiophene
Liu J., Yang S., Zhao W., Hu B., Hu S., Ma S., Lu Q.
National Engineering Research Center of New Energy Power Generation, North China Electric Power University, Beijing, China

P54 Modelling the effect of particle characteristics and process parameters during fast pyrolysis of biomass anisotropic particles with intraparticle transport phenomena and detailed kinetics
Sánchez M.¹, Maya J.C.², Chejne F.², Pecha B.³, Quinchía A.¹
¹Escuela de Ingeniería y Ciencias Básicas, Universidad EIA, Envigado; ²TAYEA, Universidad Nacional de Colombia, Medellín, Colombia, ³Biosciences Center, NREL, Golden, United States

Topic 06. Applied pyrolysis of coal, biomass and waste: Bench scale testing

P55 Continuous fast pyrolysis of different microalgae in a conical spouted bed reactor
Azizi K.¹, Haghighi A.M.¹, Moraveji M.K.¹, Arregi A.², Amutio M.², Lopez G.^{2,3}, Olazar M.²
¹Dept. of Chemical Engineering, Amirkabir University of Technology, Tehran, Iran; Dept. of Chemical Engineering, University of the Basque Country, Bilbao; ³IKERBASQUE, Basque Foundation for Science, Bilbao, Spain

P56 Catalytic hydro-pyrolysis of lignin in molten salt media: Influence of process conditions on products formation and composition
Sridharan B., Krisman B.G.A., Genuino H.C., Wilbers E., Velasco J., Winkelman J.G.M., Heeres H.J.
Engineering and Technology Institute Groningen (ENTEG), Dept. of Chemical Engineering, University of Groningen, Groningen, The Netherlands

P57 Catalytic pyrolysis of biomass using untreated alumina, olivine, spent FCC and sand
Fernandez E., Garcia I., Orozco S., Santamaria L., Cortazar M., Amutio M., Artetxe M., Olazar M.
Dept. of Chemical Engineering, University of the Basque Country (UPV/EHU), Bilbao, Spain

P58 Pyrolysis of polycoated cardboard packages
Rijo B., Briceno J., Godinho T., Lemos F., Lemos M.A.N.D.A.
CERENA, Instituto Superior Técnico, Universidade de Lisboa, Chemical Engineering Dept., Lisboa, Portugal

P59 Potential applications of the products obtained by pyrolysis of different biomass
Caballero B.M., López-Uriónabarrenechea A., de Marco I., Solar J.
University of the Basque Country (UPV/EHU), Chemical and Environmental Engineering Dept., Bilbao, Spain

P60 Comparison between slow-batch and fast-continuous pyrolysis of plastic pellets
Papari S., Berruti F.
Institute for Chemicals and Fuels from Alternative Resources, Western University, London, Ontario, Canada

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School of Chemical and Process Engineering, University of Leeds, Leeds, UK
- P62 Performance of an auger reactor for bio-oil production from heavy metals contaminated biomass**
Amato D.^{1,2}, Giudicianni P.¹, Ragucci R.¹
¹STEMS, CNR, Naples; ²DICMaPI, University Federico II, Naples, Italy
- P63 Effect of pure ZnCl₂ and its eutectic mixture on the pore distribution of the solid product during slow pyrolysis of pinewood**
De Smedt J.¹, Arauzo P.J.², Maziarka P.^{1,2}, Ronsse F.¹
¹Ghent University, Faculty of Bioscience Engineering, Dept. of Green Chemistry and Technology, Ghent, Belgium; ²University of Hohenheim, Institute of Agricultural Engineering, Dept. of Conversion Technologies of Biobased Resources, Stuttgart, Germany
- P64 Characterization of biochar and bio-oil from cocoa pod husks thermal treatment under reactive and inert atmospheres**
Londoño-Larrea P.¹, Villamarin-Barriga E.¹, García A.N.², Marcilla A.²
¹Dept. of Chemical Engineering, Central University of Ecuador, Quito, Ecuador; ²Dept. of Chemical Engineering, University of Alicante, Alicante, Spain
- P65 Torrefaction of pulp industry sludge: Experimental validation, opportunities and challenges**
Doddapaneni T.R.K.C.¹, Pärn L.², KikasT.¹
¹Chair of Biosystems Engineering, Institute of Technology, Estonian University of Life Sciences, Tartu; ²Institute of Forestry and Rural Engineering, Estonian University of Life Sciences, Tartu, Estonia
- P66 Electrode for Capacitor from Cocoa Leftover**
Rosero M.¹, Flores C.¹, Sthal U.¹, Cortez A.², Gomiz A.²
¹Chemical Engineering, Central University of Ecuador, Quito, Ecuador; ²Chemical Engineering, University of Alicante, Alicante, Spain



Topic 07. Applied pyrolysis of coal, biomass and waste: PDU and large scale operation

- P67 Fast oxidative (autothermal) pyrolysis: Performance and evaluation of the bio-oil characterization by different solvents extraction**
Tellys L.A.B.¹, Vinicius R.², Izabela da S.L.¹, Walker V.F.C.B.¹, Pablo S.A.², Ricardo R.S.²
¹Graduation Program in Biofuels - Institute of Chemistry, Federal University of Uberlandia, Uberlandia; ²Faculty of Chemical Engineering, Federal University of Uberlandia, Uberlandia, Brazil
- P68 Optimisation of low-temperature, aqueous pyrolysis condensates for downstream microbial conversion**
Parku G.K., Krutof A., Funke A., Richter D., Dahmen N.
Institute of Catalysis Research and Technology (IKFT), Karlsruhe Institute of Technology (KIT), Eggenstein-Leopoldshafen, Germany
- P69 Ex situ catalytic pyrolysis of biomass over commercial-ready catalyst: Test using a pilot-scale fluidized bed reactor**
Svanberg R., Shi Z., Han T., Yang W.
ITM-MSE, KTH Royal Institute of Technology, Stockholm, Sweden
- P70 Characterization of continuous work wood chips carbonization reactor**
Kluska J., Ochnio M., Kardaś D.
Renewable Energy Dept., The Institute of Fluid-Flow Machinery Polish Academy of Sciences, Gdańsk, Poland
- P71 The PYRENA-PYPO process development unit for pyrolysis and product fractionation of biomass and waste feedstocks**
Tsekos C.¹, Kiel J.H.A.¹
¹The Netherlands Organization for Applied Scientific Research TNO, Biobased and Circular Technologies (BCT) group, Petten, The Netherlands


Topic 08. Applied pyrolysis for recycling of polymers and plastics

- P72 Evaluation of bed defluidization in waste plastic pyrolysis performed in fountain confined conical spouted beds**
Orozco S.¹, Lopez G.^{1,2}, Artetxe M.¹ Alvarez J.³ Santamaria L.¹ Cortazar L.¹ Olazar M.¹
¹Dept. of Chemical Engineering, University of the Basque Country UPV/EHU, Bilbao; ²IKERBASQUE, Basque Foundation for Science, Bilbao; ³Dept. of Chemical and Environmental Engineering, University of the Basque Country UPV/EHU, Vitoria-Gasteiz, Spain
- P73 Thermal and catalytic co-pyrolysis of pure and waste high density polyethylene with vacuum gas oil**
Godinho T.¹, Rijo B.¹, Briceno J.¹, Lemos M.A.N.D.A.¹, Carabineiro H.², Tarelho L.A.C.³, Lemos F.¹
¹CERENA, Chemical Engineering Dept., Instituto Superior Técnico, Lisboa; ²Galp, Refinaria de Sines, Sines, Portugal; ³Dept. of Environment and Planning & CESAM, Universidade de Aveiro, Aveiro, Portugal
- P74 In-situ catalytic pyrolysis from non-recyclable plastic residues to added-value oil**
Solís R.R., Blázquez G., Pérez A., Martín-Lara M.A., Muñoz-Batista M.J., Calero M.
Dept. of Chemical Engineering, University of Granada, Granada, Spain
- P75 Activation of a char obtained from disposable plastics for CO₂ adsorption**
Solís R.R., Calero M., Ligerio A., Blázquez G., Pérez A., Muñoz-Batista M.J., Martín-Lara M.A.
Dept. of Chemical Engineering, University of Granada, Granada, Spain
- P76 Pyrolysis of waste plastics: Optimization of a continuous process unit and ex situ catalyst testing**
Ekici E.¹, Calik F.D.¹, Taylan G.G.¹, Seker E.², Wang J.³, Yildiz G.¹
¹Dept. of Energy Systems Engineering, Izmir Institute of Technology, Izmir; ²Dept. of Chemical Engineering, Izmir Institute of Technology, Izmir, Turkey; ³Energy and Bioproducts Research Institute (EBRI), Aston University, Birmingham, UK
- P77 Waste thermoplastic pyrolysis in a reactive distillation system**
Godinho T., Lemos M.A.N.D.A., Lemos F.
CERENA, Chemical Engineering Dept., Instituto Superior Técnico, Lisbon, Portugal
- P78 Plastic pyrolysis via induction heating – A new strategy to plastic waste valorisation**
Wong S.L., Armenise S., Muñoz M.
Dept. Matemática Aplicada, Ciencia e Ingeniería de Materiales y Tecnología Electrónica, Universidad Rey Juan Carlos, Madrid, Spain
- P79 Back and forth: Acidity and hierarchized structure as a dominant role on plastic pyrolysis**
Sabino A.¹, Syieluing W.¹, Marta M.¹, Franck L.², Carlos P.³, Elena P-G.³
¹Dept. of Materials, Universidad Rey Juan Carlos, Madrid, Spain; ²Laboratoire de Réactivité de Surface, Sorbonne Université, Paris, France; ³Institute of Research and Development, CEPESA, Madrid, Spain
- P80 Polypropylene effect on pyrolysis of polymer mixtures**
 Briceno J., Godinho T., Rijo B., Lemos F., Lemos M.A.N.D.A.
CERENA, Instituto Superior Técnico, Universidade de Lisboa, Chemical Engineering Dept., Lisboa, Portugal
- P81 Pyrolysis characteristics of discarded fishing net collected from Gulf of Thailand using Py-GCMS**
 Atong D.¹, Soongprasit K.¹, Sricharoenchaikul V.², Hawangchu Y.³
¹National Metal and Materials Technology Center, National Science and Technology Development Agency, Pathumthani; ²Dept. of Environmental Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok; ³Aquatic Resources Research Institute, Chulalongkorn University, Bangkok, Thailand
- P82 Synthesis of the porous activated carbon from end-of-life tire pyrolysis for CO₂ sequestration**
 Sirinwaranon P.¹, Sricharoenchaikul V.², Atong A.¹
¹National Metal and Materials Technology Center (MTEC), National Science and Technology Development Agency (NSTDA), Thailand Science Park, Pathum Thani; ²Faculty of Engineering, Dept. of Environmental Engineering, Chulalongkorn University, Bangkok, Thailand

Topic 09. Hydrothermal and solvent liquefaction; hydrothermal carbonization

- P83 Influence of process variables on hydrothermal carbonisation of pine Kraft lignin to produce biocoal**
Musa U.^{1,2}, Castro-Díaz M.¹, Thomas G.¹, Uguna C.N.¹, Snape C.E.¹
¹Dept. of Chemical and Environment Engineering, University of Nottingham, Faculty of Engineering, Nottingham, UK; ²Dept. of Chemical Engineering, Federal University of Technology, Minna, Nigeria
- P84 Hydrothermal liquefaction of lignocellulosic biomass for fuels: Influence of temperature and co-solvents**
Siu R.H.M., Cherukkattu Manayil J., Bridgwater A.V., Nowakowski D.J.
Aston University, Energy and Bioproducts Research Institute, Birmingham, United Kingdom
- P85 Hydrothermal carbonization of biomass: Influence of cellulose, hemicellulose and lignin**
Böttger J., Eckhard T., Pflieger C., Muhler M., Cerciello F.
Ruhr-Universität Bochum, Laboratory of Industrial Chemistry, Bochum, Germany
- P86 Preparation of activated hydrochars as adsorbents**
 Vega M.F., Florentino-Madiedo L., Díaz-Faes E., Barriocanal C.
Dept. de Tecnologías para la Transición Energética, Instituto de Ciencia y Tecnología del Carbono (INCAR-CSIC), Oviedo, Spain
- P87 Depolymerization and in situ hydrodeoxygenation of pyrolytic lignin in supercritical methanol with reduced Cu-Mg-Al mixed oxide catalyst**
 Liu C.¹, McClelland D.J.², Kong X.¹, Han Y.¹, Huber G.W.², Xiao R.¹
¹MOE Key Laboratory of Energy Thermal Conversion and Control, School of Energy and Environment, Southeast University, Nanjing, PR China; ²Dept. of Chemical and Biological Engineering, University of Wisconsin-Madison, Madison, WI, USA

Topic 10. Product stabilization, separation, purification and (catalytic) upgrading


- P88 Catalytic fast pyrolysis of biomass: Effect of pyrolysis conditions and zeolite structures on coke formation**
Jia L.Y.^{1,3}, Dufour A.¹, Astafan A.², Pinard L.²
¹LRGP, CNRS, Nancy; ²IC2MP, CNRS, Univ. Poitiers, France; ³School of Chemistry and Chemical Engineering, Hefei University of Technology, Hefei, China
- P89 Characterization of the main properties of lignocellulosic biomass after torrefaction pretreatment process for gasification**
Ajikashile J.O., Alhnidi M.J., Bishir M., Kruse A.
Dept. of Conversion Technology of Biobased Resources, Institute of Agricultural Engineering, University of Hohenheim, Stuttgart, Germany
- P90 Chemical characteristics of bio-oil from beech wood pyrolysis separated by fractional condensation and additional water extraction**
 XU J., Brodu N., Abdelouahed L., Taouk B.
Normandie Univ, INSA Rouen, Laboratoire de Sécurité des Procédés Chimiques, LSPC EA-4704, Rouen, France

Topic 11. Product characterization and utilization


- P91 Chestnut derived biochar for the adsorption of bioactive organic molecules**
Amato D.^{1,2}, Squillaci G.³, Giudicianni P.², Morana A.³, Ragucci R.², La Cara F.³
¹DICMaPI, University Federico II, Naples; ²STEMS, CNR, Naples; ³IRET, CNR, Naples, Italy
- P92 Advanced characterisation of upgraded HTL bio-crudes for drop-in transportation fuels**
Thomas C.M.¹, Nowakowski D.J.^{1,2}, Griffiths G.^{1,2} Bridgwater A.V.¹
¹Energy and Bioproducts Research Institute, Aston University, Birmingham; ²Chemical Engineering and Applied Chemistry, Aston University, Birmingham, United Kingdom

- P93 Tailoring of pyrolytic char properties: Effect of temperature and particle size on the pore size distribution of char obtained through single particle pyrolysis of beech wood**
Maziarka P.¹, Sommersacher P.², Almuina-Villar H.³, Retschitzegger S.², Dieguez-Alonso A.³, Ronsse F.¹
¹Dept. of Green Chemistry and Technology, Ghent University, Ghent, Belgium; ²BEST – Bioenergy and Sustainable Technologies GmbH, Graz, Austria; ³Technische Universität Berlin, Institute of Energy Engineering, Chair for Energy Process Engineering and Conversion Technologies for Renewable Energies, Berlin, Germany
- P94 Blending of hydrothermal liquefaction biocrude with residual marine fuel: An experimental assessment**
Di Fraia A.¹, Rizzo A.M.^{1,2}, Chiaramonti D.^{1,3}
¹Renewable Energy Consortium for Research and Demonstration (RE-CORD), Firenze; ²Dept. of Industrial Engineering, University of Florence; ³Energy Dept. DENERG, Polytechnic of Turin, Italy
- P95 Characterization of biochar adsorption mechanisms through adsorption of four model pharmaceutical compounds**
Loebsack G., Yeung K., Klinghoffer N., Berruti F.
Institute for Chemicals and Fuels from Alternative Resources, Western University, London, Ontario, Canada
- P96 Biochar containing composites for the production of electrical conductive materials**
Tagliaferro A.^{1,2,3}, Bartoli M.⁴, Torsello D.^{1,5}, Ghigo G.^{1,5}, Giorcelli M.^{1,2}, Rovere M.^{1,2}
¹Dept. of applied science and technology, Polytechnic of Turin, Turin; ²Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali, Florence, Italy; ³Faculty of Sciences, University of Ontario Institute of Technology, Oshawa, Canada; ⁴Center for Sustainable Future Technology, Italian Institute of Technology; ⁵Istituto Nazionale di Fisica Nucleare, Sezione di Torino, Torino, Italy
- P97 PTEs closed-loop: From biochar production via pyrolysis of contaminated biomass to its applications in soil bio-remediation**
Grottola C.M.¹, Giudicianni P.¹, Ragucci R.¹, Garau G.², Castaldi P.², Roggero P.P.²
¹Institute of Sciences and Technologies for Sustainable Energy and Mobility (STEMS) of the National Research Council (CNR), Naples; ²Dipartimento di Agraria, Università di Sassari, Sassari, Italy
- P98 Comparison of hydrothermal liquefaction and pyrolysis of cellulosic ethanol lignin: Bio-oils characterization and energy analysis**
Di Fraia A.¹, Lombardi G.¹, Miliotti E.¹, Rizzo A.M.^{1,2}, Chiaramonti D.^{1,3}
¹Renewable Energy Consortium for Research and Demonstration (RE-CORD), Firenze; ²Dept. of Industrial Engineering, University of Florence; ³Energy Dept. DENERG, Polytechnic of Turin, Italy
- P99 Influence of torrefaction as pretreatment on the fast pyrolysis of sugarcane trash**
Wu N.N.^{1,2}, Niu Q.^{1,2}, Pieters J.², Ronsse F.¹
¹Dept. of Green Chemistry and Technology, Ghent University, Ghent; ²Dept. of Plants and Crops, Ghent University, Ghent, Belgium
- P100 A study of the physicochemical properties of biomass-based activated carbon and its application in the removal of lead from aqueous solutions**
Thithai V.¹, Choi J.W.^{1,2}
¹Graduate School of International Agricultural Technology, Dept. of Green Ecosystem Engineering, Seoul National University, Pyeongchang, Gangwon-do; ²Institute of Green-Bio Science and Technology, Seoul National University, Pyeongchang, Gangwon-do, South Korea
- P101 Coupling pyrolysis products with anaerobic digestion for energy generation: Executing circular economy**
Batta N.¹, Berruti F.¹, Rehmann L.¹, Moreira C.M.²
¹Institute for Chemicals and Fuels from Alternative Resources (ICFAR), Dept. of Chemical and Biochemical Engineering, University of Western Ontario, London, Canada; ²Escuela Superior Politécnica del Litoral, ESPOL, Centro de Energías Renovables Alternativas (CERA) – Facultad de Ingeniería en Mecánica y Ciencias de la Producción (FIMCP), Guayaquil-Ecuador

- P102 Electrokinetic pre-treatment of sewage sludge before pyrolysis improves phosphorus availability and reduces heavy metal content in sludge-derived biochar**
Wang X.^{1,2}, Masek O.², Cui X.¹, Chen G.^{1,3,4}, Yan B.¹
¹School of Environmental Science and Engineering, Tianjin University, Tianjin, China; ²UK Biochar Research Centre, School of Geosciences, University of Edinburgh, Edinburgh, UK; ³School of Science, Tibet University, Lhasa; ⁴School of Mechanical Engineering, Tianjin University of Commerce, Tianjin, China

- P103 Effect of gas atmosphere during g-C₃N₄ synthesis on photocatalytic H₂ production**
 Florentino-Madiedo L., Vega M.F., Díaz-Faes E., Barriocanal C.
Dpto. de Tecnologías para la Transición Energética, Instituto de Ciencia y Tecnología del Carbono (INCAR-CSIC), Oviedo, Spain

Topic 12. Techno-economic and environmental assessments

- P104 Techno-economic assessment of pyrolysis of rubber and plastic wastes**
 Laghezza M.¹, Fiore S.², Berruti F.¹
¹Institute for Chemicals and Fuels from Alternative Resources (ICFAR), Chemical and Biochemical Engineering, University of Western Ontario, London, Canada; ²Dept. of Environment, Land, and Infrastructure Engineering (DIATI), Politecnico di Torino, Torino, Italy



Technical Tour

Thursday 19 May

- 16.15 Leave Ghent by bus to Enschede (departure from Congress Center Het Pand)
- 19.30 Arrival at Hotel Van Der Valk Enschede
- 20.00 Dinner at Hotel Van Der Valk Enschede

Friday 20 May

- 07.45 Breakfast
- 08.30 Bus transport to BTG
- 09.00 Visit of BTG
- 11.00 Visit of Empyro
- 13.00 Bus transport to Brussels Airport and Ghent

BTG Biomass Technology Group BV (BTG) has specialised in the conversion of biomass into fuels, energy and biobased raw materials for the past 30 years. BTG is an independent, private company that organised its activities in two business units.

<https://www.btgworld.com/en>

BTG Bioliquids

Our world needs renewable solutions for the production of energy and chemicals. As the leading fast pyrolysis technology provider we want to be part of these solutions: we deliver production plants that convert sustainable biomass residues into Fast Pyrolysis Bio-Oil (FPBO) that can replace fossil fuels.

<https://www.btg-bioliquids.com/>

EMPYRO

Since 2015 the Empyro plant produces 20 million litres/year of sustainable oil using the pyrolysis process developed by BTG and BTG Bioliquids BV. The plant produces, apart from the oil, also electricity - to cover its own use - and steam. The steam is supplied to the neighbouring salt factory of Nouryon. The pyrolysis oil is sold to the dairy company Royal Friesland Campina in Borculo, The Netherlands. They use the pyrolysis oil for steam generation in their boilers. It replaces a part of natural gas that is equivalent to the annual use of 8,000 households. The plant operates 24/7, is very innovative, and the first of its kind in Europe on a commercial scale.

<https://www.btg-bioliquids.com/plant/empyro-hengelo/>



Registration



On-site Participation	As of 1/04/2022
Participant	€ 600,00
Student	€ 450,00
Conference dinner on Wednesday	€ 75,00

Online Participation	As of 1/04/2022
Participant	€ 400,00
Student	€ 275,00

The registration fee for on-site participants includes:

- * Participation in all scientific sessions
- * Access to the exhibition and posters
- * Access to the ePosters
- * Abstracts of the talks and posters (PDF file)
- * Conference program
- * Lunches & coffee breaks as announced in the program
- * Welcome Reception on Sunday 15 May
- * Guided Tour on Monday 16 May
- * Happy Hour on Tuesday 17 May

The Conference Dinner is NOT included in the registration fee. Separate registration is required.

The registration fee for online participants includes:

- * Streamed access to all scientific sessions
- * Conference program (PDF file)
- * Access to the ePosters
- * Abstracts of the talks and posters (PDF file)

Payment

On-site payments are to be made cash (in Euro) or by credit card (all major credit cards are accepted).

Cancellation Policy

Any participant cancelling his/her registration before 15 April 2022, will receive a refund, less 100,00 Euro covering administration costs. No refunds are made after this date.



Social Program

Sunday 15 May

Welcome Reception - 17.00 -18.30 hrs

We kindly invite you to the Welcome Reception taking place at the congress venue 'Het Pand'. During this reception you can already collect your badge at the registration desk.

Monday 16 May

Guided City Tour - 16.00 hrs – 18.00 hrs

Experienced city guides will take you on a fascinating walking tour. We propose to meet outside the main entrance of 'Het Pand' at 16.00 hrs.

Departure at 16.10 hrs sharp. Language: English.

The tour ends at 18.00 hrs in the city center.

This visit is offered to all conference participants and exhibitors wearing the official conference badge.

Tuesday 17 May

Happy Hour during the Poster Session – 18.00 hrs – 19.30 hrs

All conference participants and exhibitors are invited to the Poster Session, taking place on the 1st floor. Poster presenters are kindly requested to be at their posters for Q&A. Free drinks are served!

Wednesday 18 May

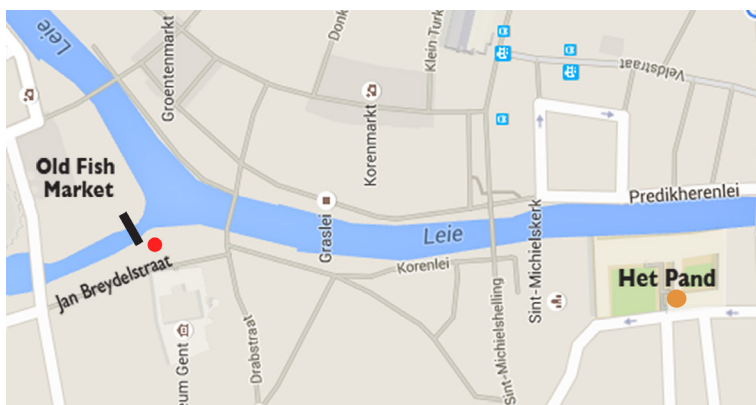
Conference Dinner – 19.00 hrs

The Conference Dinner will take place at the 'Oude Vismijn' (Old Fish Market).

Here centuries-old history and high-tech facilities go hand in hand. Opposite the Castle of the Counts lies the monumental gateway (1689) to the Old Fish Market. Neptune keeps watch over the Scheldt (male) and the Lys (female).

The Conference Dinner is NOT included in the registration fee. Separate registration is required.

Access via the bridge in the Jan Breydelstraat (see map).



Access the 'Old Fish Market' via the bridge in the Jan Breydelstraat

Het Pand
Onderbergen 1, 9000 Ghent



General Information

Dates

15 -20 May 2022

Venue

Het Pand

Onderbergen 1
9000 Ghent

Language

The Conference language is English.

Badges and Registration

It is mandatory that all Conference participants and exhibitors wear the official badges at any time. The badge gives participants access to the scientific sessions, coffee and lunch breaks, to the guided city tour and welcome reception.

In case of a lost badge a new registration will be charged.

Coffee and Lunch Breaks

Coffee and lunches will be served in the Kapittel Room, located on the ground floor.

Non-Smoking Policy

It is prohibited to smoke in 'Het Pand'.

Liability

Neither the organizers, Ghent University nor Medicongress accept liability for damages and/or losses of any kind which may be incurred by Conference participants or exhibitors during the Conference.

Participants and exhibitors are advised to take out insurance against loss, accidents or damage which could be incurred during the Conference.



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Pyro2024

24th International Symposium on Analytical and Applied Pyrolysis

May 19–24 | 2024 | Beijing | P. R. China

北京

Topics

- Intrinsic reactions and kinetics of pyrolysis
- Innovative and/or advanced pyrolysis
- Analytical pyrolysis methods and applications
- Pyrolysis for chemicals, fuels and energy
- Pyrolysis for environmental applications
- Catalysis and catalysts for pyrolysis
- Control of pyrolysis in thermochemical processes
- Engineering and industrial practices of pyrolysis

Chairs

- Prof. Guangwen Xu, Shenyang University of Chemical Technology
- Prof. Guozhu Liu, Tianjin University
- Prof. Shurong Wang, Zhejiang University
- Prof. Rui Yang, Tsinghua University

Venue

- BEIJING FRIENDSHIP HOTEL (北京友谊宾馆)

Contact

- <http://www.pyro2024.com>
- E-mail: pyro2024@syuct.edu.cn

Accommodation

- Beijing Friendship Hotel (北京友谊宾馆)
- Beijing Atour Hotel (北京亚朵酒店)
- Beijing Manxin Hotel (北京漫心酒店)
- Beijing Yanshan Hotel (北京燕山酒店)

Important dates

- 1 June, 2023: Commencement of submission
- 30 December, 2023: Deadline of submission
- 15 March, 2024: Notification of acceptance
- 15 April, 2024: End of early bird registration



BEIJING FRIENDSHIP HOTEL: Zhongguancun, Haidian
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