GHENT

# PYRO 2022

Het Pand, Ghent, Belgium

## 15 - 20 May 2022

## Final Program




www.pyro2022.org

# Table of Contents


Committees ..... 4

Welcome Address ..... 5

Scientific Program ..... 6

- Monday 16 May 2022 ..... 6
- Tuesday 17 May 2022 ..... 8
- Wednesday 18 May 2022 ..... 10
- Thursday 19 May ..... 12
- Poster List ..... 15

Technical Tour ..... 30

Registration ..... 31

Social Program ..... 32

General Information ..... 33

Sponsors ..... 40


**Free Wifi**
Make a wireless connection with 'UGentGuest'.
Enter user name/login: guestGuestp
Password: DGwXpZJQ

**Legend**

◉ Pre-recorded talk

eP e-Poster available on the PYRO 2022 website

This program belongs to:

# Committees

## Local Organizing Committee

| | |
|---|---|
| Wolter Prins | Ghent University, Department of Green Chemistry and Technology |
| Frederik Ronsse | Ghent University, Department of Green Chemistry and Technology |
| Kevin Van Geem | Ghent University, Laboratory for Chemical Technology |
| Robert Carleer | Hasselt University, Applied and Analytical Chemistry |
| Patrice Perreault | Antwerp University, Institute of Environment and Sustainable Development |
| Adriana Estrada Leon | Ghent University, Department of Green Chemistry and Technology |
| Jonas De Smedt | Ghent University, Department of Green Chemistry and Technology |
| Stef Ghysels | Ghent University, Department of Green Chemistry and Technology |

## Scientific Committee

| | |
|---|---|
| Luis Ernesto Arteaga Pérez | University of Bio-Bio, Chile |
| Anthony Dufour | CNRS Nancy, France |
| Daniele Fabbri | University of Bologna, Italy |
| Manuel Garcia-Perez | Washington State University, USA |
| Erik Heeres | Groningen University, The Netherlands |
| Sascha Kersten | Twente University, The Netherlands |
| Mark Nimlos | National Renewable Energy Laboratory, USA |
| Hajime Ohtani | Nagoya University, Japan |
| Clemens Schwarzinger | Linz University, Austria |
| Dries Vandamme | Hasselt University, Belgium |
| Bert van de Beld | Biomass Technology Group, The Netherlands |
| Shurong Wang | Zheijang University, China |
| Guangwen Xu | Shenyang University of Chemical Technology, China |
| Güray Yildiz | Izmir Institute of Technology, Turkey |



# Welcome Address

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

08.50 **Welcome**

09.10 **Opening of the Conference**
*Wolter Prins, Conference Chair*

**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**





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*

**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*

15.50 **End of Day 1**

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

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 Schwarzinger, 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*

**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*

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 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 Technologia dei Materiali, Italy*
16.50 **Fast pyrolysis bio-char as a support for $Nb_2O_5$ 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*

09.10 **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*

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*

**Session 8B**
*Product characterization and utilization*
*Chair: Ondrej Masek, University of Edinburgh, UK*

10.40 **Physical activation in one and two steps of wheat straw-derived biochar for biogas upgrading via $CO_2$ adsorption**
*Joan Manya, 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 $CO/CO_2$**
*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*

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*

**Session 9B**
*Product characterization and utilization*
*Chair: Robert Carleer, University Hasselt, Belgium*

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

16.30 **Co-pyrolysis of microalgae and glucose: Nitrogen evolution and incorporation in biochar**
*Willem Vercruysse, 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*

**Session 10B**
*Product characterization and utilization*
*Techno-economic and environmental assessments*
*Chair: Dries Vandamme, University Hasselt, Belgium*

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*

**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*

**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*

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**

# 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]
[1]Jeol Ltd., Tokyo; [2]Netzsch 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]
[1]University of Rostock, Institute of Chemistry, Division of Analytical and Technical Chemistry, Organisation, Rostock; [2]Helmholtz Zentrum München — German Research Center for Environmental Health, Cooperation Group of Comprehensive Molecular Analysis, Neuherberg, Germany; [3]University 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]
[1]Dept. of Petroleum Technology and Alternative Fuels, University of Chemistry and Technology, Prague, Czech Republic; [2]Fraunhofer-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]
[1]University of Applied Sciences Upper Austria, Wels; [2]Austrian Competence Center for Feed and Food Quality, Safety and Innovation, Wels; [3]Institute 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]
[1]Institute of Science and Technology in Art, Academy of Fine Arts Vienna, Vienna; [2]Vienna; [3]Institute for Conservation-Restoration, Academy of Fine Arts Vienna, Vienna; [4]Dept. 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]
[1]Dept. of Chemistry and Industrial Chemistry, University of Pisa, Pisa; [2]National Interuniversity Consortium of Materials Science and Technology, Florence, Italy; [3]Archäologische Staatssammlung, München; [4]Deutsches Museum, München, Germany; [5]Center for the Integration of Scientific Instruments of the University of Pisa (CISUP), University of Pisa, Pisa; [6]Soprintendenza 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]
[1]University of Pisa, Dept. of Chemistry and Industrial Chemistry, Pisa, Italy; [2]Frontier Laboratories Ltd., Koriyama, Fukushima; [3]Graduate 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]
[1]Dept. of Chemistry and Industrial Chemistry, University of Pisa, Pisa; [2]Earth and Environmental Science Dept., University of Milano Bicocca, Milano; [3]Center for Instrument Sharing of the University of Pisa (CISUP), University of Pisa, Pisa, Italy; [4]MaRHE 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. Colombini[1], Ribechini E.[1]
[1]Dept. of Chemistry and Industrial Chemistry, University of Pisa, Italy; [2]Poznan University of Life Science, Poznan; [3]Archaeological 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]
[1]Aalborg University, Dept. of the Built Environment, Aalborg, Denmark; [2]University of Pisa, Dept. of Chemistry and Industrial Chemistry, Pisa, Italy; [3]North 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**
eP
Chu X.[1,2], Fuse Y.[1], Fujitake N.[3], Hayakawa K.[4], Kudo Y.[2], Aono A.[2]
[1]Graduate School of Science and Technology, Kyoto Institute of Technology, Kyoto; [2]Shimadzu Corporation, Kyoto; [3]Graduate School of Agricultural Science, Kobe University, Kobe; [4]Lake Biwa Environmental Research Institute, Otsu, Japan

**P16** **Chemical characterization of peat by EGA-MS and multi-step Py-GC/MS methods**
eP
Fuse Y.[1], Chu X.[1,2], Takeda N.[1], Fujitake N.[3]
[1]Graduate School of Science and Technology, Kyoto Institute of Technology, Kyoto; [2]Shimadzu Cooperation, Kyoto; [3]Graduate 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.
[1]Dow Benelux B.V., Analytical Science, Terneuzen, The Netherlands; [2]Dow 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]
[1]Petroleum and Energy from Biomass Research Group (PEB), Chemistry Dept., Federal University of Sergipe (UFS), São Cristóvão – Sergipe; [2]Chemical 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., Schwarzinger 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]
[1]Dept. of Chemistry, Marshall University, Huntington, West Virginia; [2]Dept. 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]
[1]Dept. of Engineering, Chiba Institute of Technology, Narashino; [2]Kobe Material Testing Laboratory Co., Ltd., Ot; [3]The National Institute of Advanced Industrial Science and Technology, Tsukuba; [4]Katazen Corporation, Obu; [5]ISAS/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 $N_2$ and $CO_2$**
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]
[1]Normandie Univ, INSA Rouen Normandie, UNIROUEN, Laboratoire de Sécurité des Procédés Chimiques, LSPC EA-4704, Rouen, France ; [2]Lebanese 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]
[1]Dept. of Chemical Engineering, University of the Basque Country UPV/EHU, Bilbao, Spain, [2]Centre de Recherches et des Technologies de l'Energie Technopole De Borj-C´edria, Hamam Lif Ben Arous, Tunisia

**P27** **Using tungsphosphoric acid ($H_3PW_{12}O_{40}$) inmobilized on $Ce_2O$, $TiO_2$ and $SiO_2$ 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]
[1]Centro 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, [2]Laboratory of Thermal and Catalytic Processes. Wood Eng. Dept., University of Bio-Bio, Concepción, Chile

**P28** **Effects of residence time on the degradation of biomass during biochar production**
Lang M.[1], Quicker P.[1], Weber K.[2]
[1]Unit of Technology of Fuels, RWTH Aachen University, Aachen, Germany; [2]Sintef 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]
[1]Alliance for Biomass and Sustainability Research – ABISURE, Universidad Nacional de Colombia, Campus, Robledo, Medellín; [2]IN3 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** eP **Kinetic and thermodynamic studies on co-pyrolysis of mahua deoiled seed cake and plastic waste using thermogravimetric analysis**
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** eP **Determination of products from the pyrolysis of balsa wood and sugar cane residues**
Muñoz M.[1], Rosero M.[1], García A.N.[2], Marcilla A.[2]
[1]Chemical Engineering, Central University of Ecuador, Quito, Ecuador; [2]Dept. of Chemical Engineering, University of Alicante, Alicante, Spain

**P33** eP **Fast pyrolysis of Ecuadorian residual biomasses**
Oña D.[1], Salazar S.[1], Vargas D.[1,2], Andino C.[1], Mora J.[1], Van Geem K.[2], Streitweiser D.[1]
[1]Universidad San Francisco de Quito USFQ, Departamento de Ingeniería Química, Instituto de Desarrollo de Energías y Materiales Alternativos IDEMA, Quito, Ecuador; [2]Ghent University, Laboratory for Chemical Technology,Gent, Belgium

**P34** eP **Pyrolysis of Klason lignins extracted from forestry residues**
Martins M.[1], Lemos M.A.N.D. A.[1], Lemos F.[2], Pereira H.[2], Miranda I.[2]
[1]CERENA, Instituto Superior Técnico, Lisboa; [2]Centro de Estudos Florestais, Instituto Superior de Agronomia, Lisboa, Portugal

**P35** eP **Energy and exergy evaluation of beech wood pyrolysis for bio-oil production in an Auger reactor**
Campusano Mercedes B., Abdelouahed L., Taouk B.
INSA Rouen Normandie, UNIROUEN, Laboratoire de sécurité des procédés chimiques (LSPC EA 4704), Rouen, France

**P36** eP **Characterization of beach plastic wastes by analytical py- gc/ms**
Pal S.K., Vinu R.
Dept. of Chemical Engineering & National Center for Combustion Research and Development Indian Institute of Technology Madras, Chennai, India

**P37** eP **Combination of waste polymers and lignocellulosic biomass as additives in cokemaking**
Casal M.D., 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

**P38** eP **The possibility of predicting CRI/CSR of metallurgical coke using cokes prepared at laboratory scale (80 g)**
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** eP **Study on pyrolysis behavior of polymeric coated aluminium scrap using TGA and Py-GC/MS**
Vichaphund S., Wimuktiwan P., Soongprasit C., Soongprasit K., Phetchcrai S., Sirichaivetkul R., Atong D.
National Metal and Materials Technology Center, National Science and Technology Development Agency, Pathumthani, Thailand

**P40** **Co-pyrolysis of low-density polyethylene and Chilean oak using natural and modified zeolites: A Py-GC/MS study**
eP
Alejandro-Martín S.[1,2], Medina Jofré F.[2]
[1]Wood Engineering Dept., Fac. of Engineering, Universidad del Bío-Bío (UBB), Concepción.; [2]Laboratory of Gas Chromatography and Analytical Pyrolysis (LGCAP), UBB, Concepción, Chile

## Topic 04. Analytical and applied catalytic (hydro) pyrolysis

**P41** **Vapor phase upgrading from biomass hydropyrolysis 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**
eP
Nisamaneenate J.[1], Atong D.[2], Sricharoenchaikul V.[1]
[1]Dept. of Environment Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok; [2]National 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]
[1]IRC, CNR, Naples, Italy; [2]IDMEC, IST, Universidade de Lisboa, Lisboa, Portugal; [3]SCITEC, CNR, Milan, Italy, [4]Aerothermochemistry 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]
[1]Dept. of Green Chemistry and Technology, Ghent University, Ghent, Belgium; [2]BEST – Bioenergy and Sustainable Technologies GmbH, Graz; [3]Graz University of Technology, Institute of Thermal Engineering, Graz, Austria

**P46** **Disclosing the thermal reactions of aliphatic amines in the presence of $TiO_2$ nanoparticles by multi-shot analytical pyrolysis**
Komárková B.[1,2], Mattonai M.[3], Degano I.[3,4], Slovák V.[2]
[1]Institute of Inorganic Chemistry of the Czech Academy of Sciences, Husinec-Řež; [2]University of Ostrava, Dept. of Chemistry, Ostrava, Czech Republic; [3]Dept. of Chemistry and Industrial Chemistry, University of Pisa, Pisa; [4]Center 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]
[1]Clean Combustion Research Center, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia; [2]Dept. of Chemistry, Materials and Chemical Engineering ”G. Natta”, Politecnico di Milano, Milano, Italy

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

**P51** eP **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** eP **Investigation of heat transfer limitations in the Micropyrolyzer during biomass fast pyrolysis**
Nasfi M., Carrier M., Salvador S.
RAPSODEE, CNRS UMR 5203, Université de Toulouse, IMT Mines Albi, Campus Jarlard, Albi, France

**P53** eP **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** eP **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]
[1]Escuela de Ingeniería y Ciencias Básicas, Universidad EIA, Envigado; [2]TAYEA, Universidad Nacional de Colombia, Medellín, Colombia, [3]Biosciences 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]
[1]Dept. of Chemical Engineering, Amirkabir University of Technology, Tehran, Iran; Dept. of Chemical Engineering, University of the Basque Country, Bilbao; [3]IKERBASQUE, 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-Urionabarrenechea 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

**P61** **Pyrolysis-catalytic steam/dry reforming of processed municipal solid waste for control of syngas H2:CO ratio**
Penney T.K., Nahil M.A., Williams P.T.
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]
[1]STEMS, CNR, Naples; [2]DICMaPI, University Federico II, Naples, Italy

**P63** **Effect of pure $ZnCl_2$ 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]
[1]Ghent University, Faculty of Bioscience Engineering, Dept. of Green Chemistry and Technology, Ghent, Belgium; [2]University of Hohenheim, Institute of Agricultural Engineering, Dept. of Conversion Technologies of Biobased Resources, Stuttgart, Germany

**P64** eP **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]
[1]Dept. of Chemical Engineering, Central University of Ecuador, Quito, Ecuador; [2]Dept. of Chemical Engineering, University of Alicante, Alicante, Spain

**P65** eP **Torrefaction of pulp industry sludge: Experimental validation, opportunities and challenges**
Doddapaneni T.R.K.C.[1], Pärn L.[2], KikasT.[1]
[1]Chair of Biosystems Engineering, Institute of Technology, Estonian University of Life Sciences, Tartu; [2]Institute of Forestry and Rural Engineering, Estonian University of Life Sciences, Tartu, Estonia

**P66** eP **Electrode for Capacitor from Cocoa Leftover**
Rosero M.[1], Flores C.[1], Sthal U.[1], Cortez A.[2], Gomiz A.[2]
[1]Chemical Engineering, Central University of Ecuador, Quito, Ecuador; [2]Chemical 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]
[1]Graduation Program in Biofuels - Institute of Chemistry, Federal University of Uberlandia, Uberlandia; [2]Faculty 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]
[1]The 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]
[1]Dept. of Chemical Engineering, University of the Basque Country UPV/EHU, Bilbao; [2]IKERBASQUE, Basque Foundation for Science, Bilbao; [3]Dept. 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]
[1]CERENA, Chemical Engineering Dept., Instituto Superior Técnico, Lisboa; [2]Galp, Refinaria de Sines, Sines, Portugal; [3]Dept. 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 $CO_2$ adsorption**
Solís R.R., Calero M., Ligero 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]
[1]Dept. of Energy Systems Engineering, Izmir Institute of Technology, Izmir; [2]Dept. of Chemical Engineering, Izmir Institute of Technology, Izmir, Turkey; [3]Energy 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]
[1]Dept. of Materials, Universidad Rey Juan Carlos, Madrid, Spain; [2]Laboratoire de Réactivité de Surface, Sorbonne Université, Paris, France; [3]Institute of Research and Development, CEPSA, Madrid, Spain

**P80** eP **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** eP **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]
[1]National Metal and Materials Technology Center, National Science and Technology Development Agency, Pathumthani; [2]Dept. of Environmental Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok; [3]Aquatic Resources Research Institute, Chulalongkorn University, Bangkok, Thailand

**P82** eP **Synthesis of the porous activated carbon from end-of-life tire pyrolysis for $CO_2$ sequestration**
Sirinwaranon P.[1], Sricharoenchaikul V.[2], Atong A.[1]
[1]National Metal and Materials Technology Center (MTEC), National Science and Technology Development Agency (NSTDA), Thailand Science Park, Pathum Thani; [2]Faculty 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]
[1]Dept. of Chemical and Environment Engineering, University of Nottingham, Faculty of Engineering, Nottingham, UK; [2]Dept. 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** eP **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** eP **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,]
[1]MOE Key Laboratory of Energy Thermal Conversion and Control, School of Energy and Environment, Southeast University, Nanjing, PR China; [2]Dept. 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]
[1]LRGP, CNRS, Nancy; [2]IC2MP, CNRS, Univ. Poitiers, France; [3]School of Chemistry and Chemical Engineering, Hefei University of Technology, Hefei, China

**P89** **Characterization of the main properties of lignocelllulosic 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** eP **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]
[1]DICMaPI, University Federico II, Naples; [2]STEMS, CNR, Naples; [2]IRET, 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]
[1]Energy and Bioproducts Research Institute, Aston University, Birmingham; [2]Chemical 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]
[1]Dept. of Green Chemistry and Technology, Ghent University, Ghent, Belgium; [2]BEST – Bioenergy and Sustainable Technologies GmbH, Graz, Austria; [3]Technische 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]
[1]Renewable Energy Consortium for Research and Demonstration (RE-CORD), Firenze; [2]Dept. of Industrial Engineering, University of Florence; [3]Energy 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]
[1]Dept. of applied science and technology, Polytechnic of Turin, Turin; [2]Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali, Florence, Italy; [3]Faculty of Sciences, University of Ontario Institute of Technology, Oshawa, Canada;[4]Center for Sustainable Future Technology, Italian Institute of Technology; [5]Istituto 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]
[1]Institute of Sciences and Technologies for Sustainable Energy and Mobility (STEMS) of the National Research Council (CNR), Naples; [2]Dipartimento 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]
[1]Renewable Energy Consortium for Research and Demonstration (RE-CORD), Firenze; [2]Dept. of Industrial Engineering, University of Florence; [3]Energy 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]
[1]Dept. of Green Chemistry and Technology, Ghent University, Ghent; [2]Dept. 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]
[1]Graduate School of International Agricultural Technology, Dept. of Green Ecosystem Engineering, Seoul National University, Pyeongchang, Gangwon-do; [2]Institute 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]
[1]Institute for Chemicals and Fuels from Alternative Resources (ICFAR), Dept. of Chemical and Biochemical Engineering, University of Western Ontario, London, Canada; [2]Escuela 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]
[1]School of Environmental Science and Engineering, Tianjin University, Tianjin, China; [2]UK Biochar Research Centre, School of Geosciences, University of Edinburgh, Edinburgh, UK; [3]School of Science, Tibet University, Lhasa; [4]School of Mechanical Engineering, Tianjin University of Commerce, Tianjin, China

**P103** **Effect of gas atmosphere during g-$C_3N_4$ synthesis on photocatalytic $H_2$ production**
eP
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**
eP
Laghezza M.[1], Fiore S.[2], Berruti F.[1]
[1]Institute for Chemicals and Fuels from Alternative Resources (ICFAR), Chemical and Biochemical Engineering, University of Western Ontario, London, Canada; [2]Dept. 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**

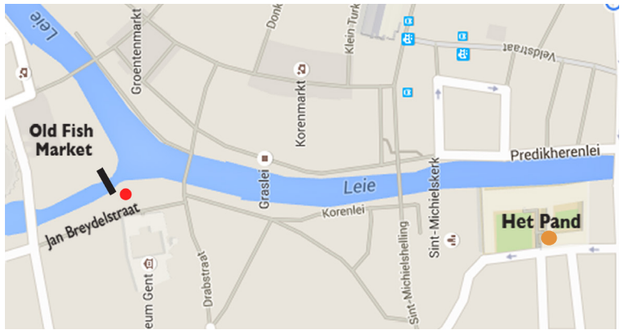
**Conference Dinner – 19.00 hrs**

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.

## Notes



## Notes

## Notes



## Notes

## Notes

# Pyro2024

## 24th International Symposium on Analytical and Applied Pyrolysis

北京

**May 19-24 | 2024 | Beijing | P. R. China**

### 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

### 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

### 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）

BEIJING FRIENDSHIP HOTEL: Zhongguancun, Haidian

*The largest and earliest garden hotel in Beijing*

# GOLD SPONSORS







# SILVER SPONSORS





# BRONZE SPONSORS