



13th International Symposium on Supercritical Fluids

Supercritical Fluids for Industry 4.0

MAY
15-18
2022

CENTRE SHERATON
MONTRÉAL HÔTEL

An event organised by



In collaboration with



ISSF 2022 Final Technical Program

May 13, 2022

*Note: Underline denotes presenter and * denotes corresponding author*

Sunday May 15, 2022

13:00 – 17:00 Registration Open
4th Floor Foyer

17:00 – 19:00 Welcome Reception
4th Floor Foyer

Monday May 16, 2022

7:00 – 8:00 Breakfast
Ballroom West

8:15 – 8:30 Welcome to ISSF 2022
Ballroom West
Chair: F. Temelli (University of Alberta, Canada)

8:30 – 9:30 Plenary Session
Ballroom West
Chair: F. Temelli (University of Alberta, Canada)

- P-1** **BRUNNER LECTURE: Polymers and supercritical fluids - A personal journey**
E. Kiran
* Erdogan Kiran, Department of Chemical Engineering, Virginia Tech, Blacksburg, Virginia, USA (ekiran@vt.edu)

9:30 – 10:00 Case Study
Ballroom West
Chair: F. Temelli (University of Alberta, Canada)

- CS-1** **Optimisation of nanomaterials synthesis at industrial scale**
E. Lester
* Ed Lester, Faculty of Engineering, University of Nottingham, UK
(edward.lester@nottingham.ac.uk)

10:00 – 10:20 Coffee Break
Ballroom Centre

10:20 - 12:10 Session 1: Process Design
Ballroom East
Chairs: Ž. Knez (University of Maribor, Slovenia) and E. Weidner (Fraunhofer Institute UMSICHT, Germany)

- 10:20- 10:50 **KL-1** **Fundamental data for design of processes using supercritical fluids**
Ž. Knez, D. Cör Andrejč, M. Knez Marevci
* Zeljko Knez, Faculty of Chem. and Chem. Eng., University of Maribor, Maribor, Slovenia (zeljko.knez@um.si)
- 10:50-11:10 **O-1** **High pressure electrochemical CO₂ reduction to ethanol – Downstream separation process and economics**
M. Dorn, S. Kareth, M. Petermann, E. Weidner
* Marvin Dorn, Chair of Process Technology, Ruhr-University Bochum, Bochum, Germany (dorn@vtp.ruhr-uni-bochum.de)
- 11:10 – 11:30 **O-2** **A real time simulator of a supercritical fluid extraction (SFE) system**
M. Roodpeyma, C. Street, S. Guigard, W. Stiver
* Maedeh Roodpeyma, SCFCan Inc., Edmonton, Alberta, Canada (maedeh.roodpeyma@scfcan.ca)
- 11:30 – 11:50 **O-3** **The first of its kind of industrial application of supercritical fluid on continuous chromatography by simulated moving bed**
M.-T. Liang, X.Q. Bao
* Ming-Tsai Liang, JOPE Technology CO. LTD., Kaohsiung, Taiwan (mtliang@jope-smb.com)

10:20 - 12:10 Session 2: Particle formation
Drummond East
Chairs: V. Trivedi (University of Kent, United Kingdom) and J. Kim (Sungkyunkwan University, Republic of Korea)

- 10:20- 10:50 **KL-2** **Nanoencapsulation of carotenoids via temperature-induced phase transition of triblock polymer in supercritical carbon dioxide (scCO₂)**
C.I. Wosu, V. Trivedi, P.J. Harvey
* Vivek Trivedi, University of Kent, Chatham Maritime, UK (v.trivedi@kent.ac.uk)

- 10:50-11:10** **O-5** ***Lutein PGSS encapsulation at low temperature for a better controlled release***
M. Schneider, Y. Masmoudi, F. Matonti, C. Olmière, E. Badens
 * Yasmine Masmoudi, Aix-Marseille University, CNRS, Centrale Marseille, M2P2, Marseille, France (yasmine.masmoudi@univ-amu.fr)
- 11:10 – 11:30** **O-6** ***Encapsulation of astaxanthin with β -cyclodextrin by utilizing Supercritical Antisolvent (SAS) Process***
 S. Wulandari, A.A. Myint, J. Kim
 * Jaehoon Kim, School of Chemical Engineering, Sungkyunkwan University, Suwon, Republic of Korea (jaehoonkim@skku.edu)
- 11:30 – 11:50** **O-7** ***Microencapsulation and surface passivation fine porose particles***
P. Niga, A. Ahniyaz
 * Petru Niga, RISE Research Institute of Sweden, Stockholm, Sweden (petru.niga@ri.se)
- 11:50 – 12:10** **O-8** ***Whey processed by Pressurized Gas eXpanded (PGX) liquid technology***
E.Y. Wong, B. Yépez, B. Seifried, P. Moquin, R. Couto, F. Temelli
 * Feral Temelli, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (feral.temelli@ualberta.ca)

10:20 - 12:10 **Session 3: Waste remediation**
Drummond Centre
Chairs: D. Cantero (Institute of Bioeconomy, Spain) and P.A. Segura (Université de Sherbrooke, Canada)

- 10:20- 10:50** **KL-3** ***The sudden expansion reactor for hydrothermal upgrading of biomass***
D. Cantero
 * Danilo Cantero, Institute of Bioeconomy, Valladolid, Spain (danilo.cantero@uva.es)
- 10:50-11:10** **O-9** ***Fate of acetyl salicylic acid, diclofenac, gabapentin and trimethoprim during wet air oxidation***
 C. Guérette, P. Lemoine, P. Ramirez, P.A. Segura
 * Pedro A. Segura, Université de Sherbrooke, Sherbrooke, Quebec, Canada (pa.segura@usherbrooke.ca)
- 11:10 – 11:30** **O-10** ***Accelerated carbonation of construction materials by using slag from steel and metal production as substitute for conventional raw materials***
M. Prokein, K. Fuchs, N. Mölders, M. Renner, E. Weidner
 * Michael Prokein, Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT, Oberhausen, Germany (michael.prokein@umsicht.fraunhofer.de)

11:30 – 11:50 **O-11** ***Experimental assessment of the supercritical carbonation of recycled concrete aggregates***
S. Ndiaye, J. S. Condoret, F. Bourgeois, L. Cassayre, S. Camy
* Séverine Camy, Laboratoire de Génie Chimique (LGC) - Institut National Polytechnique de Toulouse (INPT), Toulouse, France (severine.camy@ensiacet.fr)

12:10 – 13:30 Lunch
Ballroom West

13:30 – 15:00 Session 4: Aerogels
Ballroom East
Chairs: B. Seifried (Ceapro Inc., Canada) and Z. Novak (University of Maribor, Slovenia)

13:30 – 14:00 **KL-4** ***Aerogels & composites: From concept to applications***
B. Seifried, P. Moquin, B. Yépez, R. Couto, E.Y. Wong, J. Mahmoudi, J. Hu
* Bernhard Seifried, Ceapro Inc., Edmonton, Alberta, Canada
(bseifried@ceapro.com)

14:00 – 14:20 **O-13** ***Hybrid silica-polysaccharide aerogels: promising new materials***
Z. Novak, G. Horvat, M. Pantić, Ž. Knez
* Zoran Novak, University of Maribor, Faculty of Chemistry and Chemical Engineering, Maribor, Slovenia (zoran.novak@um.si)

14:20 – 14:40 **O-15** ***Detailed study of mass transfer kinetics during supercritical drying of biopolymer-based aerogels using spatially resolved Raman spectroscopy***
M.P. Dirauf, A.S. Braeuer
* Andreas Braeuer, TU Bergakademie Freiberg, Freiberg, Germany
(andreas.braeuer@tu-freiberg.de)

13:30 – 15:00 Session 5: Food and Natural Health Products
Drummond East
Chairs: J.W. King (CFS, USA) and M. Goto (Nagoya University, Japan)

13:30 – 14:00 **KL-5** ***Industrialization and scale-up of cannabis and hemp processing using sub- and supercritical fluids***
J.W. King
* Jerry King, CFS, Fayetteville, Arkansas, USA (kingjw100@hotmail.com)

14:00 – 14:20 **O-19** ***Comparative extraction of cannabinoids***
M. Sarrazin, A.C. Martel, Y. Boumghar
* Mathieu Sarrazin, CEPROCQ Collège de Maisonneuve, Montreal, Quebec, Canada
(msarrazin@cmaisonneuve.qc.ca)

14:20 – 14:40 **O-20** ***Acacia dealbata Link. biomass – a prospective source of valuable lupane triterpenoids using supercritical fluid extraction***
V.H. Rodrigues, I. Portugal, C.M. Silva,
* Carlos Manuel Silva, CICECO – Aveiro Institute of Materials, Department of Chemistry, University of Aveiro, Aveiro, Portugal (carlos.manuel@ua.pt)

14:40 – 15:00 **O-21** ***Application of supercritical CO₂ to truffle species: aromatic and flavoring extracts***
E. Tejedor-Calvo, P. Marco, P. Spègel, C. Soler-Rivas
* Eva Tejedor-Calvo, Agrifood Research and Technology Centre of Aragon, Zaragoza, Spain (etejedorc@aragon.es)

13:30 – 15:00 **Session 6: Phase Equilibria and Thermophysical Properties**
Drummond Centre
Chairs: I. Pioro (Ontario Tech University (UOIT), Canada) and A. Scurto (University of Kansas, USA)

13:30 – 14:00 **KL-6** ***Specifics of calculation thermophysical properties in the critical point with NIST REFPROP software and current and future applications of SCFs in power engineering***
I. Pioro, H. Xie, M. Mahdi
* Igor Pioro, FESNS Ontario Tech University (UOIT), Oshawa, Ontario, Canada (igor.pioro@uoit.ca)

14:00 – 14:20 **O-25** ***CO₂-water equilibrium from ambient conditions to 300 °C and 500 bar. A fugacity-activity coefficient approach.***
L. Vaquerizo, D.A. Cantero
* Danilo A Cantero, Department of Chemical Engineering and Environmental Technology, University of Valladolid, Valladolid, Spain (danilo.cantero@uva.es)

14:20 – 14:40 **O-26** ***Measurement and mathematical description of the ternary phase equilibrium of carbon dioxide, acetone and isopropanol***
M. Kőrösi, P. Miranda Rey, Cs. Varga, D. Dudás, E. Székely
* Márton Kőrösi, Department of Chemical and Environmental Process Engineering, Budapest University of Technology and Economics, Budapest, Hungary (mkorosi@edu.bme.hu)

14:40 – 15:00 **O-27** ***Phase behavior of binary systems of carbon dioxide with dibasic esters at elevated pressures, including near critical regions***
A. Hayu Tiwikrama, T. Kristanto, M.-J. Lee
* Ardila Hayu Tiwikrama, National Taipei University of Technology, Taipei, Taiwan (ardilahayu@mail.ntut.edu.tw)

15:00 – 15:15 **Coffee Break**
Ballroom Centre

15:15 – 16:15 **Poster Session**
Ballroom Centre
Chair: J.F. Vermette (CTTÉI, Canada) and S. Guigard (University of Alberta, Canada)

16:15 – 17:15 **Session 4: Aerogels (continued)**
Ballroom East
Chairs: B. Seifried (Ceapro Inc., Canada) and Z. Novak (University of Maribor, Slovenia)

- 16:15 – 16:35 **O-16** ***Pectin + lentil protein gels dried by supercritical CO₂***
S. Mekala, M.D.A. Saldaña
* Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)
- 16:35 – 16:55 **O-17** ***Supercritical CO₂ as an efficient tool in the fabrication of CuOZnO-rGO 3D aerogels for highly selective catalytic CO₂ hydrogenation***
M. Kubovics, P. Florin Coldea, J. Moral Vico, A. Sánchez, A.M. López-Periago, C. Domingo
* Márta Kubovics, Materials Science Institute of Barcelona (ICMAB-CSIC), Bellaterra, Spain (mkubovics@icmab.es)
- 16:55 – 17:15 **O-18** ***ZIF-8@Graphene Oxide / PEI composite aerogel for heavy metal capture in water***
A. Borrás, G. Gonçalves, B. Henriques, A.M. López-Periago, C. Domingo
* Alejandro Borrás, Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Cerdanyola del Vallès, Spain (aborras@icmab.es)

16:15 – 17:15 **Session 5: Food and Natural Health Products (continued)**
Drummond East
Chairs: J.W. King (CFS, USA) and M. Goto (Nagoya University, Japan)

- 16:15 – 16:35 **O-23** ***Valorization of apple pomace with the use of Supercritical CO₂***
V. Numa, C. Crampon, A. Bellon, E. Badens
* Venicia Numa, Aix Marseille Univ, CNRS, Centrale Marseille, M2P2, Marseille, France and Symrise SAS, Clichy, France (venicia.numa@symrise.com)
- 16:35 – 16:55 **O-24** ***Subcritical water hydrolysis of pea protein concentrate and its mixture with citrus pectin***
H.P.H. Vo, M.D.A. Saldaña
* Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)

16:15 – 17:15 **Session 6: Phase Equilibria and Thermophysical Properties (continued)**
Drummond Centre
Chairs: I. Pioro (Ontario Tech University (UOIT), Canada) and A. Scurto (University of Kansas, USA)

- 16:15 – 16:35 **O-28** ***Molecular dynamics and phenomenological modeling of experimental diffusivities in supercritical mixtures***
B. Zêzere, I. Portugal, J.R.B. Gomes, C.M. Silva
* Carlos Manuel Silva, CICECO – Aveiro Institute of Materials, Department of Chemistry, University of Aveiro, Aveiro, Portugal (carlos.manuel@ua.pt)

16:35 – 16:55 **O-29** ***Numerical analysis of heat transfer of supercritical water in multiple rod channels***
H. Han, C. Zhang
* Chao Zhang, Department of Mechanical & Materials Engineering, Western University, London, Ontario, Canada (czhang@eng.uwo.ca)

16:55 – 17:15 **O-30** ***Heat transport properties of ionic liquids with compressed and supercritical fluids***
K.S. Al-Bharghouti, A.M. Scurto
* Aaron Scurto, University of Kansas, Department of Chemical & Petroleum Engineering, Lawrence, Kansas, USA (ascurto@ku.edu)

17:30 – 18:30 **ISASF General Meeting**
Drummond East

Tuesday, May 17, 2022

7:00 – 8:00 **Breakfast**
Ballroom West

8:20 – 8:30 **Welcome to Day 2**
Ballroom West
Chairs: F. Temelli (University of Alberta, Canada) and C. Maheux-Picard (CTTÉI, Canada)

8:30 – 9:30 **Plenary Session**
Ballroom West
Chair: M.D.A. Saldaña (University of Alberta, Canada)

P-2 ***Benefits of supercritical fluid technology in the context of industrial ecology and Industry 4.0: Some challenging new pharmaceutical and biomedical applications***
E. Badens, C. Crampon, A. Mouahid, Y. Masmoudi
* Elisabeth Badens, Aix Marseille University, Aix-en-Provence, France
(elisabeth.badens@univ-amu.fr)

9:30 – 10:30 **Case Studies**
Ballroom West
Chair: M.D.A. Saldaña (University of Alberta, Canada)

9:30 – 10:00 **CS-2** ***Separation technology using supercritical CO₂: Technology transfer from university to industry and spin-off company***
M. Goto, M. Tanaka
* Motonobu Goto, Institute of Materials Innovation, Nagoya University, Nagoya, Japan and Super Critical Technology Centre Co. Ltd., Kuwana, Japan
(goto.motonobu@material.nagoya-u.ac.jp)

10:00 – 10:30 **CS-3** ***Production of spherical aerogels using compressed CO₂ - from laboratory to industrial scale***
E. Weidner, M. Renner, N. Mölders, D. Hintemann, A. Sengespeick, C. Dworatzyk, M. Sanner
* Manfred Renner, Fraunhofer UMSICHT/Ruhr University, Oberhausen, Germany (Manfred.renner@umsicht.fraunhofer.de)

10:30 – 10:45 **Coffee Break**
Ballroom Centre

10:45 – 12:15 **Session 7: Pasteurization and Sterilization**
Drummond East
Chairs: C.A. García-González (Universidade de Santiago de Compostela, Spain) and C. Crampon (Aix-Marseille University, France)

10:45 – 11:15 **KL-7** ***In vivo bone regeneration in sheep model of sterile polymeric scaffolds processed by supercritical CO₂ technology***
V. Santos-Rosales, L. Diaz-Gomez, B. Magariños, C. Alvarez-Lorenzo, C.A. García-González
* Carlos A. García-González, Departamento de Farmacología, Farmacia y Tecnología Farmacéutica, Universidade de Santiago de Compostela, Santiago de Compostela, Spain (carlos.garcia@usc.es)

11:15 – 11:35 **O-31** ***Supercritical CO₂-based process to clean and sterilize FFP2 facial masks***
A. Cario, G. Aubert, C. Aymonier
* Cyril Aymonier, ICMCB-CNRS, Pessac, France (cyril.aymonier@icmcb.cnrs.fr)

11:35 – 11:55 **O-32** ***Sterilization and reprocessing of FFP3 face masks through supercritical CO₂ technology***
V. Santos-Rosales, C. López-Iglesias, S. Ghazanfari, B. Magariños, C. Alvarez-Lorenzo, C.A. García-González
* Carlos A. García-González, Departamento de Farmacología, Farmacia y Tecnología Farmacéutica, Universidade de Santiago de Compostela, Santiago de Compostela, Spain (carlos.garcia@usc.es)

11:55 – 12:15 **O-33** ***Microbial inactivation and drying by supercritical carbon dioxide***
R. Zulli, P. Andriago, F. Santi, A. Zambon, S. Spilimbergo
* Riccardo Zulli, University of Padova, Padova, Italy (riccardo.zulli@unipd.it)

10:45 – 12:15 **Session 8: Polymers**
Ballroom East
Chairs: L.G. Kaake (Simon Fraser University, Canada) and S. Sarrade (CEA, France)

10:45 – 11:15 **KL-8** ***Self-assembly at supercritical pressures: Top-down meets bottom-up approaches to nanotechnology***
L.G. Kaake
* Loren Kaake, Department of Chemistry, Simon Fraser University, Burnaby, British Columbia, Canada (loren_kaake@sfu.ca)

- 11:15 – 11:35 O-34** *Glass transition behavior of poly(methyl methacrylate) in compressed carbon dioxide revisited – New perspectives*
J.A. Sarver, E. Kiran
 * Erdogan Kiran, Department of Chemical Engineering, Virginia Tech, Blacksburg, Virginia, USA (ekiran@vt.edu)
- 11:35 – 11:55 O-35** *Cellulose acetate modification towards antibiofilm properties via chemical attachment of quaternary ammonium compounds using supercritical CO₂*
M. Nowak, D. Semba, D. Misic, T. Pólbrat, D. Stojanovic, A. Trusek, I. Zizovic
 * Mariusz Nowak, Wrocław University of Science and Technology; Faculty of Chemistry, Department of Bioprocess, Micro and Nano Engineering, Wrocław, Poland (mariusz.nowak@pwr.edu.pl)
- 11:55 – 12:15 O-36** *Post-treatments of injected polyamides parts using supercritical fluids*
 D. Getto, O. Renard, O.J.C Poncelet
 * Olivier Renard, CEA, Grenoble, France (olivier.renard@cea.fr)

12:15 – 13:30 Lunch
 Ballroom West

13:30 – 14:30 Three Minute Thesis (3MT) Competition
 Ballroom West
 Chair: M.D.A. Saldaña (University of Alberta, Canada)

14:30 – 14:45 Coffee Break
 Ballroom Centre

14:45 – 16:55 Session 9: Sustainability
 Drummond Centre
 Chairs: P. Lacroix-Desmazes (CNRS, France) and S. Camy (Toulouse University, France)

- 14:45 – 15:15 KL-9** *A step towards circular economy of critical minerals: polymer-assisted supercritical CO₂ extraction of Pd from spent supported catalysts*
P. Lacroix-Desmazes, W.S.J. Li, A. Ruiu, C. Bouilhac, O. Gimello, M. Senila, K. Seaudeau-Pirouley, B. Bauer-Siebenlist, S. Böringer
 * Patrick Lacroix-Desmazes, CNRS, Institute Charles Gerhardt Montpellier UMR 5253, Montpellier, France (patrick.lacroix-desmazes@enscm.fr)
- 15:15 – 15:35 O-37** *Supercritical water for the treatment of hypersaline brine waste*
K. Duba, J. Chen, W. Mckeel, J.T. Filho, T. Abdel-Salam
 * Kura Duba, College of Engineering and Technology; East Carolina University, Greenville, North Carolina, USA (dubak17@ecu.edu)
- 15:35 – 15:55 O-38** *Polymeric membrane for the low energetic demand of supercritical CO₂ (sc-CO₂)*
 D. Chabni, S. Camy, J.-S. Condoret, J.-C. Remigy
 * Séverine Camy, Laboratoire de Génie Chimique, Toulouse University, Toulouse, France (severine.camy@ensiacet.fr)

15:55 – 16:15 **O-39** ***Biopolyol production from black liquor via ultrafast depolymerization in supercritical water***
E. Demirkaya, D. Cantero, M. J. Cocero
* Maria Jose Cocero, BioecoUva Research Institute, High Pressure Processes Group, Department of Chemical Engineering and Environmental Technology, University of Valladolid, Valladolid, Spain (mjcocero@iq.uva.es)

14:45 – 16:55 **Session 10: Reactions in Sub/Supercritical Fluids**

Drummond East

Chairs: T. Adschiri (Tohoku University, Japan) and C. Aymonier (ICMCB-CNRS, France)

14:45 – 15:15 **KL-10** ***Chemical reactions in supercritical water and their applications***

T. Adschiri

* Tadafumi Adschiri, Tohoku University, Sendai, Japan
(tadafumi.ajiri.b1@tohoku.ac.jp)

15:15 – 15:35 **O-41** ***PMMA hydrolysis in subcritical water: temperature, time and pH effects***

A.M. Fernández, A. Redondo, M. Simard, M.A. Rodríguez-Pérez, D. Cantero

* Danilo Cantero, Institute of Bioeconomy; University of Valladolid, Valladolid, Spain
(Danilo.Cantero@uva.es)

15:35 – 15:55 **O-42** ***A preliminary investigation of microreactor designs for supercritical water oxidation using hydrothermal flames for space applications***

D. Sharma, A. Erriguible, O. Nguyen, C. Lecoutre, Y. Garrabos, U. Hegde, M. Hicks, S. Marre

* Deewakar Sharma, ICMCB-CNRS / CNES, Pessac, France
(deewakar.edu@gmail.com)

15:55 – 16:15 **O-43** ***A suitable electrolyte for high pressure CO₂ reduction? Investigation of conductivity and salt spectrum in "alcoholic potash".***

M. Dorn, S. Kareth, M. Petermann, E. Weidner

* Marvin Dorn, Chair of Process Technology, Ruhr-University Bochum, Bochum, Germany (dorn@vtp.ruhr-uni-bochum.de)

16:15 – 16:35 **O-44** ***Two-step synthesis, combining SC-CO₂ coating and hydrothermal conversion, applied to porous zeolite-based sorbent preparation for wastewater treatment***

A. Hertz, A. Escamilla-Perez, Y. Barre, A. Grandjean

* Audrey Hertz, CEA, DES, ISEC, DMRC, Univ Montpellier, Marcoule, France
(audrey.hertz@cea.fr)

14:45 – 16:55 **Session 11: Scale up and industrial applications**
Ballroom East
Chairs: L. Chordia (Thar Process, Inc., USA) and B. Seifried (Ceapro Inc., Canada)

- 14:45 – 15:15 **K-11** ***Thar Process: Historical development, successes, and challenges in scale-up and commercial scale processing***
L. Chordia
* Lalit Chordia, Thar Process, Inc., Pittsburgh, United States (chordia@thartech.com)
- 15:15 – 15:35 **O-46** ***Study on the industrialization of supercritical processes in the frame of an R&D project***
K. Seaudeau-Pirouley, B. Legros, C. Guizard, S. Sarrade, W.S.J. Li, A. Ruiu, C. Bouilhac, P. Lacroix-Desmazes, M. Senila, B. Bauer-Siebenlist, S. Böringer
* Karine Seaudeau Pirouley, Innovation Fluides Supercritiques, Alixan, France (k.seaudeau@supercriticalfluid.org)
- 15:35 – 15:55 **O-47** ***Natex vision for a proximate future in the field of supercritical CO₂ applications on industrial scale***
M. Sova, J. Fernandes, F. Seitingner, E. Lack
* Martin Sova, NATEX Prozesstechnologie GesmbH, Ternitz, Austria (m.sova@natex.at)
- 15:55 – 16:15 **O-48** ***Extraction of omega-3 fatty acids from Atlantic sea cucumber (Cucumaria frondosa) viscera using supercritical carbon dioxide***
J. Lin, G. Jiao, A. Kermanshahi-pour.
* Azadeh Kermanshahi-pour, Biorefining and Remediation Laboratory, Department of Process Engineering and Applied Science, Dalhousie University, Halifax, Nova Scotia, Canada (azadeh.kermanshahipour@dal.ca)
- 16:15 – 16:35 **O-49** ***Development of an industrial wet air oxidation for waste treatment: a success story***
J. Gendron, O. Boutin, J.-H. Ferrasse, S. Lefèvre, J.F. Vermette, A.Viand
* Sebastien Lefèvre, INOVERTIS-A3i, Donzère, France (s.lefevre@inovertris.fr)
- 16:35 – 16:55 **O-50** ***Wet Air Oxidation in Quebec: Industrial opportunities and challenges - An update on CTTEI's research program***
J.F. Vermette, J. Gendron, P. Lemoine, A. Dirany, P. Ramirez
* Jean-François Vermette, CTTÉI, Sorel-Tracy, Quebec, Canada (jeanfrancois.vermette@cttei.com)

18:00 **Buses depart from Sheraton for Gala dinner**

19:00 – 23:00 **Gala Dinner**
Cruise aboard the Cavalier Maxim

Wednesday, May 18, 2022

7:00 – 8:00 Breakfast
Ballroom West

8:15 – 8:30 Welcome to Day 3 and Jerry W. King Poster Award
Ballroom West
Chair: F. Temelli (University of Alberta, Canada)

8:30 – 9:30 Plenary Session
Ballroom West
Chair: F. Temelli (University of Alberta, Canada)

P-3 ***Supercritical thinking towards sustainability***
Y. Lee
* Youn-Woo Lee, School of Chemical and Biological Engineering & Institute of Chemical Processes, Seoul National University, Seoul, Republic of Korea (ywlee@snu.ac.kr)

9:30 – 10:00 Case Study
Ballroom West
Chair: F. Temelli (University of Alberta, Canada)

CS-4 ***The IDELAM Company and ICMCB laboratory - Innovative supercritical CO₂ processes to face the recycling and waste management challenges of our modern society - From Laboratory research to Industrial development***
T. Voisin, E. Durivault, C. Aymonier
* Cyril Aymonier, CNRS, Univ. Bordeaux, Bordeaux INP, ICMCB, UMR 5026, Pessac, France (cyril.aymonier@icmcb.cnrs.fr)

10:00 – 10:20 Coffee Break
Ballroom Centre

10:20 – 12:30 Session 12: Particle formation and nanomaterials
Ballroom East
Chairs: T. Tomai (Tohoku University, Japan) and E. Lester (University of Nottingham, UK)

10:20 – 10:50 **KL-12** ***Process intensification for regeneration of facet-controlled nanocatalyst in supercritical water***
T. Tomai, L. Tang, A. Yoko, Y. Omura, G. Seong, T. Adschiri
* Takaaki Tomai, Tohoku University, Sendai, Japan (takaaki.tomai.e6@tohoku.ac.jp)

10:50 – 11:10 **O-51** ***Continuous supercritical hydrothermal synthesis of boehmite nanoparticles: Influence of morphology on adsorbed water.***
E. Peigney, G. Aubert, M. Cavarroc, A. Poulon-Quintin, C. Aymonier
* Erwan Peigney, Univ. Bordeaux, CNRS, Bordeaux INP, ICMCB, UMR 5026, Pessac, France (erwan.peigney@icmcb.cnrs.fr)

- 11:10 – 11:30** **O-52** ***Towards the continuous production of functional nanomaterial inks for 3D-printed electronic device applications using supercritical water***
R. Worsley, A. Bastola, R. Hague, C. Tuck, E. Lester
 * Robyn Worsley, Faculty of Engineering, University of Nottingham, Nottingham, United Kingdom (robyn.worsley@nottingham.ac.uk)
- 11:30 – 11:50** **O-53** ***Flow supercritical synthesis of stable colloidal solutions of biocompatible InGaN nanoparticles***
B. Dusolle, I. Bord-Majek, V. Jubéra, C. Aymonier
 * Cyril Aymonier, CNRS, Univ. Bordeaux, Bordeaux INP, ICMCB, UMR 5026, Pessac, France (cyril.aymonier@icmcb.cnrs.fr)
- 11:50 – 12:10** **O-54** ***Preparation of Pt-CeO₂ nanoparticles using supercritical hydrothermal method for low-temperature chemical looping steam methane reforming process***
G. Seong, K. Furuya, A. Yoko, T. Tomai, T. Adschiri
 * Tadafumi Adschiri, NICHe, Tohoku University, Sendai, Japan (tadafumi.ajiri.b1@tohoku.ac.jp)
- 12:10 – 12:30** **O-55** ***Investigating Microfluidic Supercritical Antisolvent process: In situ micro-experiments and High Performance Computing***
A. Erriguible, T. Jaouhari, S. Glockner, S. Fery-Forgues, C. Aymonier, S. Marre
 * Arnaud Erriguible, Bordeaux INP; I2M/ICMCB, Pessac, France (erriguible@enscbp.fr)

10:20 – 12:30 **Session 13: Pharmaceutical applications**
Drummond East
Chair: R. Viveiros (NOVA University of Lisbon, Portugal)

- 10:20 – 10:50** **KL-13** ***Development of dummy artificial receptors for smart pharmaceutical purification processes***
R. Viveiros, V.D.B. Bonifácio, W. Heggie, T. Casimiro
 * Raquel Viveiros, CleanMIPTech group, LAQV-REQUIMTE, Chemistry department, NOVA School of Science & Technology, NOVA University of Lisbon, Portugal, Almada, Portugal (rfv17327@fct.unl.pt)
- 10:50 – 11:10** **O-56** ***Preparation of pharmaceutical cocrystals using supercritical carbon dioxide***
L. MacEachern, A. Kermanshahi-pour, M. Mirmehrabi
 * Azadeh Kermanshahi-pour, Biorefining and Remediation Laboratory, Department of Process Engineering and Applied Science, Dalhousie University, Halifax, Nova Scotia, Canada (azadeh.kermanshahipour@dal.ca)

- 11:10 – 11:30** **O-57** ***Green strategies on the development of biopurification antibody-like materials using supercritical CO₂***
A.I. Furtado, R. Viveiros, T. Casimiro
 * Ana Furtado, CleanMIPTech group, LAQV-REQUIMTE, Chemistry Department, NOVA School of Science & Technology, NOVA University of Lisbon, Portugal, (ai.furtado@campus.fct.unl.pt)
- 11:30 – 11:50** **O-58** ***Supercritical CO₂ synthesis of CaSyr-1 BioMOF and its promising properties as drug delivery system***
A. Rosado, J. Fraile, O. Vallcorba, A.M. López-Periago, J.A. Ayllón, C. Domingo
 * Albert Rosado, Materials Science Institute of Barcelona (ICMAB-CSIC), Bellaterra, Spain (arosado@icmab.es)
- 11:50 – 12:10** **O-59** ***Supercritical CO₂ applied on the production of liposomal dry powder formulations towards the lung inflammation treatment***
C. Costa, B. Nobre, A.S. Matos, A.S. Silva, T. Casimiro, M.L. Corvo and A. Aguiar-Ricardo
 * Clarinda Costa, LAQV-REQUIMTE, Chemistry Department, NOVA School of Science and Technology, Universidade NOVA de Lisboa, Lisbon, Portugal (cid.costa@campus.fct.unl.pt)
- 12:10 – 12:30** **O-60** ***On-chip in-situ observations of crystallization events under supercritical CO₂***
F. Ercicek, O. Nguyen, A. Erriguible, C. Harscoat-Schioavo, P. Subra-Paternault, S. Marre
 * Fatma Ercicek, ICMCB, Pessac, France (fatma.ercicek@u-bordeaux.fr)

10:20 – 12:30 **Session 14: Biomass utilization**

Drummond Centre

Chairs: M.D.A. Saldaña (University of Alberta, Canada) and M.J. Cocero (University of Valladolid, Spain)

- 10:20 – 10:50** **KL-14** ***Pressurized fluid processes for biorefinery and production of high-value added products from biomass***
M.D.A. Saldaña
 * Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)
- 10:50 – 11:10** **O-61** ***Cork fractionation via chemical approach and pressurized hot water***
E.G. Mission, M.J. Cocero
 * Elaine Mission, PressTech, Instituto de Bioeconomia de la Universidad de Valladolid, Valladolid, Spain (elaineg.mission@uva.es)
- 11:10 – 11:30** **O-62** ***Value-added compounds obtained from shrimp shells using pressurized fluids with carboxylic acids***
Z. Liu, M. Matouri, M.D.A. Saldaña
 * Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)

- 11:30 – 11:50** **O-63** ***Lignin valorisation using supercritical water technology. Lignin repolymerization.***
T. Adamovic, M.J. Cocero
* María José Cocero, BioecoUVa Universidad de Valladolid, Valladolid, Spain
(mjcocero@iq.uva.es)
- 11:50 – 12:10** **O-65** ***Eco-friendly and energy-saving strategy for high-yield astaxanthin recovery from wet Haematococcus pluvialis***
A.A. Myint, S. Wulandari, J. Kim
* Jaehoon Kim, Sungkyunkwan University, Suwon, Gyeong Gi-Do, Republic of Korea
(jaehoonkim@skku.edu)

12:30 – 14:00 **Lunch and Closing Session with Awards**
Ballroom West

Posters

- P-1** ***Combining CO₂ valorization strategies to produce hydrogen and methane in a geological storage context***
E. Vidal, C. Fauveau, C. Aymonier, A. Cario, S. Marre
* Samuel Marre, ICMCB - CNRS, Pessac, France (samuel.marre@icmcb.cnrs.fr)
- P-2** ***Scale-up study of a subcritical water extraction (SWE) laboratory system for Gelidium sesquipedale red algae residue valorization***
E. Trigueros, P. Alonso-Riaño, C. Ramos, C. I. K. Diop, M.T. Sanz, S. Beltrán, A.E. Illera
* Alba Ester Illera, University of Burgos, Biotechnology and Food Science Dept. (Chemical Engineering Section), Burgos, Spain (aeillera@ubu.es)
- P-3** ***Subcritical water processing of fava bean concentrate to obtain bioactive compounds***
J.P. Chavez Garcia, H. Vo, M.D.A. Saldaña
* Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)
- P-4** ***Downstream applications of supercritical and subcritical fluids for the complete valorization of eel by-products targeting to the era of zero waste***
J.-S. Park, V. Chandra Roy, S.-Y. Kim, S.-C. Lee, J.-M. Han, B.-S. Chun
* Byung-Soo Chun, Pukyong National University, Nam-gu, Republic of Korea
(bschun@pknu.ac.kr)

- P-5** ***Production of ethyl esters from radish seeds using a sequential process under pressurized fluid conditions***
N. Stevanato, B. T. F. Mello, M.D.A. Saldaña, L. Cardozo-Filho, C. Silva
* Marleny Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)
- P-6** ***Modeling and parametric analysis of trans-resveratrol extraction from grape cane waste with pressurized water + ethanol mixture***
M.A. Martins, M.D.A. Saldaña
* Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)
- P-7** ***Supercritical CO₂ drying of berries***
E. Sánchez, M.D.A. Saldaña
* Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)
- P-8** ***Physicochemical and biofunctional characteristics of Sargassum thunbergii extracts using subcritical water and conventional solvents extraction***
J.-M. Han, J.-S. Park, D. Surendhiran, B.-S. Chun
* Byung-Soo Chun, Department of Food Science and Technology, Pukyong National University, Busan, Republic of Korea (bschun@pknu.ac.kr)
- P-9** ***Impact of SCCO₂ on flour characteristics and lipase activity in different flour types***
G.Hojnik Podrepšek, Ž. Knez, M. Leitgeb
* Maja Leitgeb, University of Maribor, Faculty of Chemistry and Chemical Engineering, Maribor, Slovenia (maja.leitgeb@um.si)
- P-10** ***High recovery of biologically active compounds from red ginseng marc using subcritical water***
R. Cao, A.A. Myint, J. Kim
* Jaehoon Kim, School of Mechanical Engineering, Sungkyunkwan University, Suwon, Republic of Korea (jaehoonkim@skku.edu)
- P-11** ***Supercritical CO₂ Extraction of terpenoids and alpha/beta-acids from canadian cascade hops***
H.H.P. Vo, A. Aghashahi, S. Mekala, D. Powers, M.D.A. Saldaña
* Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)
- P-12** ***Obtaining phenolic compounds from Barbatimão (Stryphnodendron adstringens (Mart.) Coville) bark by pressurized liquid extraction***
M.M.S. Ribeiro, D.B. Coelho, N.S. Novais, J. Viganó, P.C.Veggi
* Priscilla Carvalho Veggi, Department of Chemical Engineering, Institute of Environmental, Chemical and Pharmaceutical Sciences, Universidade Federal de São Paulo, Diadema-SP, Brazil (pveggi@unifesp.br)

- P-13** ***Wettability behavior of lignin-cellulose composites obtained after supercritical water hydrolysis of birch wood***
V. Leontijevic, T. Adamovic, D. Cantero, M.J. Cocero Alonso
* Maria Cocero, Department of Chemical Engineering and Environmental Technology, University of Valladolid, Valladolid, Spain (mjcocero@iq.uva.es)
- P-14** ***Zigzag crystals of sodium bicarbonate produced in the Supercritical Anti-Solvent (SAS) process***
S. Clercq, C. Crampon, E. Badens
* Elisabeth Badens, Aix Marseille Université, Istres, France (elisabeth.badens@univ-amu.fr)
- P-15** ***Sterilization by supercritical CO₂: FASTECO2 project***
V. Warambourg, A. Mouahid, C. Crampon, A. Galinier, E. Badens
* Victorine Warambourg, M2P2, Aix Marseille University, France, Aix en Provence cedex, France (victorine.warambourg@univ-amu.fr)
- P-16** ***A novel pasteurization method for solid foods: a case study***
P. Andrigo, R. Zulli, F. Santi, A. Zambon, S. Spilimbergo
* Sara Spilimbergo, Industrial Engineering Department of the University of Padova (Italy), Padova, Italy (sara.spilimbergo@unipd.it)
- P-17** ***Treatment of medical devices using supercritical processes***
Z. Laggoune, Y. Masmoudi, T. Song, C. Bureau, E. Badens
* Zohra Laggoune, Aix Marseille University France, M2P2 Laboratoire Mécanique, Modélisation et Procédés Propres – UMR CNRS 7340 -, Aix en Provence, France (zohra.laggoune@etu.univ-amu.fr)
- P-19** ***Kinetic and thermodynamic study of supercritical CO₂ sorption within polymers used in medical devices and their packaging***
Y. Masmoudi, T. Tassaing, M. B. Abdou, M. Lerest, P. Raymond, E. Badens
* Yasmine Masmoudi, Aix Marseille Univ, CNRS, Centrale Marseille, M2P2, Aix en Provence, France (yasmine.masmoudi@univ-amu.fr)
- P-20** ***Effect of pressurized water + ethanol on hydrolysis of wheat straw***
A.X. Vidrio-Sahagun, M.D.A. Saldaña
* Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)
- P-21** ***Ecovalorization of Haematococcus pluvialis using carbon dioxide expanded ethanol***
M. Sarrazin, N. El Mehdi, S. Safa, Y. Boumghar
* Mathieu Sarrazin, CEPROCQ, Montreal, Quebec, Canada (msarrazin@cmaisonneuve.qc.ca)

- P-22** *Effect of pressurized fluid assisted by ultrasound processing on hydrolysis of shrimp shell*
M. Matouri, M.D.A. Saldaña
* Marleny D.A. Saldaña, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada (marleny.saldana@ualberta.ca)
- P-23** *Optimization of supercritical carbon dioxide extraction of rosmarinic acid from clary sage*
M.C. Chadni, E.I. Isidore, I.I. Ioannou
* Morad Chadni, URD ABI, Pomacle, France (morad.chadni@agroparistech.fr)
- P-25** *Conversion of soybean oil to jet fuel-range hydrocarbons with sub-/supercritical water*
J. Choi, A.A. Myint, J. Kim
* Jaehoon Kim, Sungkyunkwan University, suwon-si, Gyeonggi-do, Republic of Korea (whdgh46@naver.com)
- P-26** *Method development for quantification of nitrogenous degradation products after wet air oxidation for hospital effluents and toxicity evaluation.*
M. Moreau, P. Lemoine, P. A. Segura
* Megane Moreau, Département de chimie, Faculté des Sciences, Université de Sherbrooke, Environmental and Analytical Chemistry Laboratory, Sherbrooke, Quebec, Canada (megane.moreau@usherbrooke.ca)
- P-27** *Treatment of primary sewage sludge by wet air oxidation: Quantification of pharmaceutical micropollutants and microplastics before and after treatment*
A. Dirany, J-F. Vermette, P. Lemoine, M. Moreau, N. Nayrac, F-X. Teyssere, P.A. Segura
* Ahmad Dirany, Centre de Transfert Technologique en Écologie Industrielle (CTTÉI), Sorel-Tracy, Quebec, Canada (ahmad.dirany@cttei.com)
- P-28** *Subcritical water treatment of the industrial solid residue generated from Gelidium sesquipedale after agar extraction*
E. Trigueros, P. Alonso-Riaño, R. Melgosa, A.E. Illera, O. Benito-Román, C.I. Diop, M.T. Sanz, S. Beltrán
* Sagrario Beltrán, University of Burgos, Burgos, España (beltran@ubu.es)
- P-29** *Integrated recovery of sea buckthorn by supercritical CO₂*
N. El Mehdi, S. Sanaz, Y. Boumghar
* Yacine Boumghar, CEPROCQ, Montreal, Quebec, Canada (yboumghar@cmaisonneuve.qc.ca)