



19th European Meeting on Supercritical Fluids

Budapest, 21st-24th May, 2023

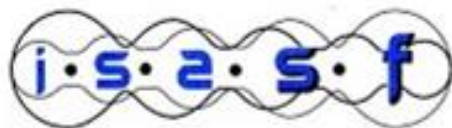
Scientific program

Location: Main building of the Budapest University of Technology and Economics, 1st floor
XI. Műegyetem rkp 3, Budapest, Hungary

Gold sponsor:



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international society for
the advancement of supercritical fluids

Meet the exhibitors during the conference

Each day



On Monday



On Tuesday



May 21, Sunday, 16:00-21:00 Registration

May 21, Sunday, 18:00-21:00 Welcome reception (included in all registrations)

May 22, Monday, 8:30-09:00 Opening and welcome

May 22, Monday, 9:00-10:00 Plenary session 1.

Prof. Dr.-Ing. Manfred Renner (Institute Director Fraunhofer UMISCHT, Germany): The European Green Deal – Chance and Challenge for New Products and Processes

Parallel sessions 1

May 22, Monday

Location:	Representation Hall	Professors' Club	Pécsi Eszter Room
	Technology	Ultrahigh pressure and fluid properties	Novel Materials
10:30-11:00	J. Kremer: From laboratory to industry - Scale-up considerations for supercritical fluid processes (Appl1)	Ž. Knez: Design of Ultra High Pressure Processes (FP1)	A. O'Sullivan: Pharmaceutical Cocrystal Solid-State and Particle Size Control Using Supercritical CO ₂ -Assisted Nano-Spray Drying (NovMat1)
11:00-11:20	B. Legros: Supercritical CO ₂ purification of recycled polyolefin to be use back as food grade packaging at industrial scale (Appl2)	M.H.H. Fechter: A microfluidic device for the determination of thermophysical properties at elevated pressure and temperature (FP2)	M. Champeau: Supercritical impregnation of polycarbonate and poly(L-lactic acid) with clove extract: effect of operational conditions on the loading and composition (NovMat2)
11:20-11:40	X.-Q. Bao: Supercritical Fluid Simulated Moving Bed Chromatography and Its Industrial Application in Separating Eicosapentaenoic Acid Ethyl Ester from Fish Oil (Appl3)	J.-S. Schaefer: Determination of diffusion coefficients as a function of the composition of binary mixtures of CO ₂ and organic solvent (FP3)	R. Worsley: Towards the Continuous Production of Functional Nanomaterial Inks for 3D-Printed Electronics Using Supercritical Water (NovMat3)
11:40-12:00	M. V. Fernandez Cid: Commercialization and Scale-up of cannabinoids processed with Supercritical carbon dioxide (Appl4)	M. Dorn: Electrical conductivity and CO ₂ solubility of organic electrolytes for high pressure CO ₂ reduction (FP4)	Z. Novak: Manufacturing of dual porous interconnected biopolymer-based scaffolds for bone implants (NovMat4)

Parallel sessions 2			
May 22, Monday			
Location:	Representation Hall	Professors' Club	Pécsi Eszter Room
	Technology	Fluid phase equilibria	Novel Materials
13:00-13:30	G.F. Woerlee: Textile dyeing with Supercritical carbon dioxide and its other possibilities (Appl5)	M. Kőrösi: Experimental determination methods of high-pressure phase equilibria (FP5)	L. Padrela: Continuous production of directly compressible drug nanoparticles using CO ₂ -assisted spray coating (NovMat5)
13:30-13:50	E. Santos: Effect of packing material on liquid hold-up during countercurrent fractionation of a lipid mixture using supercritical carbon dioxide (Appl6)	D. Arany: Development of an automatic method for measuring melting point under carbon dioxide pressure (FP6)	F. Carrascosa: Reinforcement PLGA-based scaffolds foaming via supercritical CO ₂ (NovMat6)
13:50-14:10	C. Cejudo: Study of the impregnation mode to load bioactive compounds from red grape pomace into PLA filaments (Appl7)	N. Piche: Dissolution behaviour of lubricating oils in liquid and supercritical CO ₂ (FP7)	D. Valor: Impregnation of bimetallic Ce-Ti particles on a polymeric PCL scaffold using supercritical CO ₂ (NovMat7)
14:10-14:30	K. Fuchs: Accelerated carbonation of construction materials by using slag from steel and metal production as substitute for conventional raw materials (Appl8)	A. Fabien: Supercritical Carbon Dioxide Fractionation: Case Study for Ethanol-Water Mixtures (FP8)	Z. Han: Physicochemical properties of MoS ₂ nanosheets under different conditions in SCCO ₂ exfoliation processing (NovMat8)

Parallel sessions 3

May 22, Monday

Location:	Representation Hall	Professors' Club	Pécsi Eszter Room
	Application-oriented	Green chemistry	Novel Materials
15:00-15:30	E. Badens: Supercritical Sterilization of Implantable Medical Devices: From Laboratory Scale to Industry (Appl9)	E. Lester: Self Optimizing Supercritical Flow Reactors (GreenChem1)	G. Della Porta: Microfluidic Technology and Supercritical Fluid: A New Challenge for Drug Delivery Formulation ((NovMat9)
15:30-15:50	P. Trucillo: Production of PCL foams loaded with karkadè extracted by the Naviglio technique (Appl10)	C. Erkey: Selective Synthesis of Cu Species in Zeolites via Supercritical Ion Exchange (GreenChem2)	L. Baldino: Niosomes: The new generation of vesicles for drug delivery (NovMat10)
15:50-16:10	E. Cruz: New polymeric membranes for the encapsulation of lavender supercritical CO ₂ extracts for biomedical applications (Appl11)	T. Tomai: Hydrothermal electrochemical reduction for carbon circulation (GreenChem3)	A. Dandre: Novel acetylacetonate precursors-based synthesis of Strontium Titanate nanoparticles in supercritical water/ethanol mixture (NovMat11)
16:10-16:30	A. Gombert: Extraction of Madder root dyes : Comparison of processes (maceration, ultrasound, sc-CO ₂) and optimisation of sc-CO ₂ extraction (Appl12)	M. Prokein: Development of a zero-gap electrolyser for the continuous electrochemical conversion of dense carbon dioxide to value-added products (GreenChem3)	A. Borrás: Hierarchical porosity composite aerogels of MOFs and graphene oxide (NovMat12)
16:30-16:50	O. Ciftci: Development of novel high bioavailability curcumin formulation using nanoporous starch bioaerogels (Appl13)	L. Roach: Machine Learning in Supercritical Fluids Research (GreenChem4)	L. De Marco: Production of corticosteroid/cyclodextrin inclusion complexes through supercritical assisted atomization (NovMat13)

May 22, Monday, 17:00-18:00 General meeting of ISASF

May 22, Monday, 18:30- Guided sightseeing (included in all registrations)

May 23, Tuesday, 8:30-9:30 Plenary session 2.

Prof. Jaehoon Kim (Sungkyunkwan University, South Korea): Role of sub- and supercritical solvents for biomass conversion

Parallel sessions 4

May 23, Tuesday

Location:	Representation Hall	Professors' Club	Pécsi Eszter Room
	Application-oriented	Nature-based solutions	Novel materials
9:30-10:00	Y. Zhao: Continuous countercurrent supercritical CO ₂ technique: several cases of practical applications in terms of pilot and industrial scale production (App14)	J.W. King: Ultra-high pressure SFE: Optimization and industrial application (NBS1)	C. Aymonier: Nucleation & growth in supercritical fluids: from fundamentals to advanced materials ((NovMat14)
10:00-10:20	L. Guillouzo: Lipsticks become green! (App15)	E. Trigueros: Subcritical Water and Conventional Extraction of Phenolic compounds from Onion Skin Waste: Implications in Diabetes Disease (NBS2)	S. Nandi: Continuous production of itraconazole injectable nanosuspensions by an integrated supercritical CO ₂ assisted spray drying process (NovMat15)
10:20-10:40	E. Tejedor-Calvo: The use of SFE and PLE to revalorize low-quality black truffle (<i>Tuber melanosporum</i>) (App16)	G. Direur: Antibacterial functionalization of implantable medical textiles: The potential of supercritical CO ₂ (NBS3)	A. Rosado: Supercritical CO ₂ processing of CaSyr-1 bioMOF for developing a potential drug delivery system with intriguing triple bioactivity (NovMat16)
10:40-11:00	E. Yemiskan: Extraction of Marine Collagen Derivatives from <i>Hoplostethus mediterraneus</i> Cuvier, 1829 Using a Pressurized Water - CO ₂ System (App17)	D.G.F. Guajardo-Flores: Nutricosmetic potential of avocado <i>Persea Americana</i> industrial waste extracts obtained with supercritical CO ₂ (NBS4)	M. Kubovics: scCO ₂ assisted metal loading on Fe(BTC) semiamorphous MOF: application in catalytic CO ₂ hydrogenation (NovMat17)

Parallel sessions 5			
May 23, Tuesday			
Location:	Representation Hall	Professors' Club	Pécsi Eszter Room
	Application-oriented	Waste valorization	Nature-based solutions
11:30-12:00	E. Kiran: Temperature Scaling for Rational Selection of Polymer Foaming Conditions with Supercritical Fluids as Physical Blowing Agents (Appl18)	M.J. Cocero: The role of supercritical water in the valorization of polyesters wastes (Waste1)	E. Ibanez: NADEs as promising solvents in high-pressure extraction (PLE) of bioactives from avocado residues (NovMat18)
12:00-12:20	P. Belmonte: Synthesis and supercritical CO ₂ foaming of thermoplastic polythiourethanes with different hard segment content. (Appl19)	Q. Zheng: Simultaneous material and chemical recycling of PET/PE multi-layer film using a semi-batch hydrothermal system (Waste2)	M. Yavuz-Düzgün: Investigation on black carrot extract loaded potato protein particle formation by PGSS-drying (NovMat19)
12:20-12:40	E. Poque: Biohybrid materials decellurization through supercritical CO ₂ process (Appl20)	J. Béri: Semi-continuous hydrothermal hydrolysis of poli(bisphenol A carbonate) to bisphenol A monomer (Waste3)	A. T. Getachew: Supercritical CO ₂ for efficient extraction of high-quality starfish (<i>Asterias amurensis</i>) oil (NovMat20)
12:40-13:00	J.A. Villamil Jiménez: Foaming of PLA biocomposites by supercritical CO ₂ assisted extrusion process (Appl21)	C. Dilek: Depolymerization of Polylactic Acid in Supercritical Carbon Dioxide (Waste4)	T. Moreno: Extraction of Lipids and Phospholipids from Marine Biomasses using Subcritical and Supercritical Fluids (NovMat21)

Parallel sessions 6			
May 23, Tuesday			
Location:	Representation Hall	Professors' Club	Pécsi Eszter Room
	Energy	Waste valorization	Novel materials
14:00-14:20	T. Huddle: Flow visualisation technique for optimisation of continuous-flow hydrothermal reactor design (En1)	J. Vauloup: Strategic metals extraction from LIBs cathode materials by supercritical CO ₂ assisted by functional copolymers as CO ₂ -philic complexing agents (Waste5)	L. Avédikian: Control of the nano-phased NiO-YSZ microstructure using supercritical CO ₂ synthesis (NovMat22)
14:20-14:40	S. Daniarta: Thermodynamic efficiency of transcritical power cycle (En2)	N. Zachmann: Development of a Sub- and Supercritical Carbon Dioxide Extraction Process for the Selective Recovery of the Electrolyte from spent Li-Ion Batteries (Waste6)	O. P. Konuk: Maleic Acid Crosslinked Sodium Carboxymethyl Cellulose Aerogels for Sustainable and Bio-Based Thermal Insulation Applications (NovMat23)
14:40-15:00	Y. Nakayasu: Enhancement of Organic Redox Supercapacitor by supercritical CO ₂ impregnation of quinones (En3)	N. Hayagan: Direct recycling of Li-ion battery positive electrodes assisted by supercritical CO ₂ (Waste7)	I. Lázár: Production of aerogels containing gold nanoparticles using sol-gel technology and supercritical drying for catalytic applications (NovMat24)
15:00-15:20	L. Schaul: The effect of acoustic wave propagation on heat conduction near the critical point – a numerical study of piston effect (En4)	Y. Deng: Recycling of strategic metals from WEEE in supercritical CO ₂ (Waste8)	S. Nandi: Novel polymorphs of Doxycycline monohydrate produced by ultrasonication-enhanced antisolvent recrystallization process using supercritical CO ₂ (NovMat25)
15:20-15:40	A.R. Imre: A novel supercritical fluid based thermodynamic cycle for the utilization of heat sources with small heat flux (En5)	M. Watanabe: Metal recovery of LiMn ₂ O ₄ -based spent lithium-ion battery cathode material using hydrothermal leaching with organic acids and precipitation separation (Waste9)	T. Adschiri: Synthesis of single nm size CeO ₂ by supercritical hydrothermal (NovMat26)
15:40-16:00	A. Kiss: The current results of ECC-SMART project: different analysis on the Supercritical Water-cooled Small Modular Nuclear Reactor (En6)	V. Leontijevic: Upcycling of Tomato Peel residues by supercritical water hydrolysis (Waste9)	C. Harscoat-Schiavo: Cocrystallization of Naproxen and Bipyridine assisted by supercritical CO ₂ . CO ₂ solvent or CO ₂ antisolvent, what is the best process? (NovMat27)

May 23, Tuesday, 16:00-17:30 Poster session, best poster competition

16:00-17:30

S. Milovanovic: Influence of supercritical carbon dioxide extraction process temperature and co-solvent addition on the quality of green tea leaves extracts (Post01)

S. Milovanovic: Selection of process conditions for the integrated process of supercritical CO₂ extraction from green tea leaves and impregnation onto polymer films (Post02)

Y.-R. Shin: Valorization of Skipjack Tuna (*Katsuwonus pelamis*) By-Products Using Supercritical CO₂ Extraction (Post03)

A. Gavarić: Application of supercritical fluid extraction and conventional extraction techniques for isolation of bioactives from *Marrubium peregrinum* (Post04)

G. Romero: Effect of supercritical CO₂ extraction to obtain c-phycoerythrin from spirulina (*Arthrospira maxima*) (Post05)

J. Park: Phospholipids from conger eel byproducts using supercritical carbon dioxide: Lipidomic profiles and quality evaluation (Post06)

L. Jūrienė: Biorefining of *Tagetes patula* flowers by high pressure extraction methods (Post07)

L. Jūrienė: Extraction and fractionation of lipophilic components from black chokeberry (*Aronia melanocarpa* L.) pomace with supercritical CO₂ (Post08)

L. Jūrienė: Recovery of valuable lipophilic components from mechanically separated sour cherry pomace fractions by supercritical CO₂ extraction (Post09)

B. Pavlič: Supercritical fluid extraction of wild thyme:

Experiments and mass-transfer based models (Post10)

L. Calvo: Microbial load of the hemp and of the cannabinoid rich extracts after supercritical and ethanolic extraction. Importance of the hemp moisture (Post11)

M. Stamenic: Optimization of *Cannabis sativa* supercritical CO₂ extraction using Design of experiments approach (Post12)

M. Stamenic: Supercritical fluid extraction from dandelion seeds (Post13)

P. Trucillo: Comparison of Supercritical Assisted and Rapid Solid Liquid Dynamic (RSLDE) Techniques for the Extraction of Active Principles from Hops and Chrysanthemum (Post14)

M. Tyrka: Cellulose Acetate Films and Starch Aerogels as Usnic Acid Carriers (Post25)

M. Tyrka: Supercritical Impregnation of Potato Starch Aerogels with Carnosic Acid (Post26)

S. Mottola: Supercritical CO₂ impregnation of caffeine in biopolymer films to produce anti-cellulite patches (Post27)

M. Pantić: Chitosan-PCL scaffolds for biomedical applications (Post28)

G. Horvat: Formulation of biopolymer-based aerogels for wound healing applications (Post29)

I. Stambouli: Depolymerization of organosolv lignin in a supercritical CO₂-ethanol system (Post30)

M. Irgolič: Multistage hydrothermal degradation of multilayer packaging waste in sub- and supercritical water (Post31)

A. Bermejo López: Lactic production acid from biomass-derived sugars using acid or basic catalysts (Post32)

L. Castro: Hydrolysis with subcritical water of the agroindustrial byproduct of jaboticaba for the production of hydrolyzate rich in fermented sugars (Post33)

L. Castro: New integrated method for producing must rich in fermentable sugars from açai seed (Post34)

P. Lotz: Controlled release of flavour filled yeast capsules produced by a scCO₂ assisted spraying process (Post35)

G. Piel: Supercritical CO₂ for the production and sterilization of liposomes in a one-step process (Post36)

N. Penoy: The use of supercritical CO₂ to develop liposomes encapsulating active pharmaceutical ingredients for pulmonary administration (Post37)

M. Baassiri: CFD Modelling of Supercritical CO₂-assisted Spray Drying for Pharmaceutical Manufacturing Applications (Post38)

A. Fehér: Analytical evaluation of non-Fourier heat pulse experiments on room temperature (Post39)

M. Champeau: Solubility of aspirin, ketoprofen and R-(-)-carvone in supercritical CO₂ in binary, ternary and quaternary systems: Effect of co-solutes (Post40)

Y.-N. Shin: Subcritical Water Extraction of *Saccharina japonica* Root: A Promising Source of Natural Glycemic Inhibitors for Postprandial Blood Sugar Control (Post15)

J. Jovaišaitė: The recovery of lipophilic compounds of *Vincetoxicum* species by supercritical carbon dioxide extraction (Post16)

V. Sarv: Extraction of lipophilic components from rowanberry pomace with supercritical CO₂ and their fractionation at subcritical conditions (Post17)

O. Benito-Román: Valorization of onion skin wastes: subcritical water extraction of pectin and membrane downstream processing (Post18)

R. Gallego: Microalgae extracts enriched in carotenoids with potential anti-inflammatory and neuroprotective activities (Post19)

E. Ibanez: Extraction of neuroprotective compounds from Eucalyptus leaves using green technologies. Ternary mixture design (Post20)

E. Ibanez: Evaluation of the Neuroprotective Effect of Extracts Obtained by PLE with Biobased Solvents from *Tetraselmis chuii* as a Novel Food (Post21)

E. Ibanez: Antioxidant and potential neuroprotective activity of *Heliotropium taltalense* I.M. Johnst (Heliotropiaceae) Extracts Obtained by Pressurized Liquid Extraction (Post22)

M. Martínez-Ávila: Revaluation of the Sacha inchi seed oil obtained through a supercritical CO₂ extraction (Post23)

D. Pinto: Supercritical decellularization of cornea: From Laboratory Scale to Industry (Post24)

D. Rhee: Melting and Crystallization Temperatures of poly(ϵ -caprolactone) in Carbon Dioxide and Nitrogen as Descriptors of its Foaming Behavior (Post41)

J. Triquet: Wood modification with alkoxysilane using supercritical CO₂ (Post42)

P. Jaeger: Application of Supercritical Fluid Technology for processing PVDF in the context of circular economy (Post43)

Z. Chen: Effect of high-pressure carbon dioxide combined with modified atmosphere package on the quality of fresh-cut squash during storage (Post44)

M. Sauceau: Effect of ultrasound on the foaming of PMMA-based polymers (Post45)

S. Camy: Coupling of membrane filtration with supercritical processes for substantial energy cost reduction (Post46)

A.E. Illera: Valorization of brewer's spent grain by furfural recovery/removal from subcritical water hydrolysates by pervaporation (Post47)

M. Osada: Prediction of the Liquid-Liquid—Equilibria for Water + Organic Compounds Systems at High-Temperature Conditions Using Machine Learning (Post48)

E. Pasini: Process development for the catalytic cyclohexene oxide copolymerization in sCO₂: impact of the phase behavior (Post49)

Z. Knez: Influence of SC CO₂ on laccase stability and activity (Post50)

T. Müller: Tailored Bond Cleavage in Lignin Depolymerization with Ruthenium Catalysts (Post51)

May 23, Tuesday, 19:00-22:00 Gala dinner (with prior reservation only)

21:30- Party for all participants (included in all registrations) at the A38 ship

May 24, Wednesday, 9:00-10:00 Plenary session 3.

sponsored by:



Dr Vaclav Dostal (Czech Technical University of Prague, Czech Republic): Application of Supercritical CO₂ Technology to Modern Energy Systems

Parallel sessions 7

May 24, Wednesday

Location:	Representation Hall	Professors' Club	Pécsi Eszter Room
	Fluid properties and digitalization	Nature-based solutions	Novel materials
10:30-10:50	J.P.S. Aniceto: Machine learning models for the prediction of diffusivities in supercritical SC-CO ₂ systems (FP9)	M. Yu: Towards the debittering of Andean lupin beans via supercritical carbon dioxide extraction (NBS5)	T. Huddle: Digital manufacturing of metal oxide nanocomposites via interpretable machine learning models (NovMat28)
10:50-11:10	C. Aymonier (on behalf of S. Marre): Microfluidic SuperCritical Water Oxidation: First observations of hydrothermal flames at microscale (FP10)	H. Boumghar: Development of bioactive cannabis extracts through optimization of green supercritical fluid process (NBS6)	M. Schneider: PGSS process applied to protein entrapment: a study of bovine serum albumin (NovMat29)
11:10-11:30	S. Schneider: Mixing Performance of a Planetary Roller Extruder Revealed through Computational Fluid Dynamics (CFD) Simulations (FP11)	Y. Zhao: Extraction of essential oil from <i>Boswellia</i> resin using sub-, and supercritical CO ₂ by stepwise increasing pressure (NBS7)	C. Erkey: scCO ₂ Assisted Preparation of Bimetallic and Trimetallic Pt Alloy Nanoparticles on Crosslinked Alginate Aerogel Derived N-Doped Carbon Aerogels as ORR Electrocatalysts (NovMat30)
11:30-11:50	D. M. Takács: Numerical studies of the supercritical van der Waals fluid in the Widom region (FP12)	G. Núñez: Effect of pretreatment on the supercritical CO ₂ extraction yield of microalgae lipids: experimental data and modelling (NBS8)	G. Lamanna: Towards understanding the interplay between atomisation, evaporation and the onset of single phase mixing in transcritical sprays (NovMat31)
11:50-12:10	T.V.B. Fonseca: Diffusion coefficient of 2,4,6-trichloroanisole in carbon dioxide by molecular dynamics simulations (FP13)	M.M.A. Martínez-Ávila: <i>Kalanchoe daigremontiana</i> extracts obtained with supercritical CO ₂ as selective ethnomedicine, a bioguided analysis (NBS9)	C. Bufalini: The potential of supercritical emulsion extraction for the encapsulation of <i>Arthrospira platensis</i> polyphenolic extract (NovMat32)

Parallel sessions 8			
May 24, Wednesday			
Location:	Representation Hall	Professors' Club	Pécsi Eszter Room
	Waste valorization	Green Chemistry	Safe and Sustainable by Design
13:00-13:30	A.T. Quitain: Progress on CO ₂ -H ₂ O Based Green Approaches for Biomass Valorization (Waste11)	T. Müller: Kinetics and Reaction Pathways of Carbon Dioxide Hydrogenation in High-Pressure Reactors to Value-Added Products (GreenChem6)	J.Y. Clavier: Supercritical Fluid Processes industrialization. Is it so green and so expensive? A chemical engineering approach of case studies (SSbD1)
13:30-13:50	D.G.F. Guajardo-Flores: Characterization of pomegranate (<i>Punica granatum</i>) industrial waste extracts obtained with supercritical CO ₂ (Waste12)	E. Lester: Catalytic and non-catalytic supercritical water gasification with wastewater as a feedstock (Waste15)	L. Calvo: "How to Choose a Safer Solvent following the Principles of Green Engineering for botanical extraction" (SSbD3)
13:50-14:10	P. Barea: Subcritical water hydrolysis of water-soluble protein from fish meal: effect of pressurization agent and temperature (Waste13)	J.F. Rodriguez: Synthesis of Biobased Non-Isocyanate Polyurethanes (NIPUs) in Supercritical CO ₂ (SSbD2)	L. Gibowsky: Natural grown Aerogels from Fruits, Vegetables and Mushrooms: Processing and Characterization (SSbD4)
14:10-14:30	N. Fernández: High pressure as a tool to valorize food waste streams (Waste14)	M. Eternot: Effect of the carbon chain length of different SC alcohols, from C1 to C4, on pine wood fractionation, in a semi-continuous reactor (NBS10)	T. Devière: ecoScience - Development of new analytical methodologies for a greener science of the environment (SSbD5)
14:35-15:00 B. Schenk: Researchers' visibility for successful grant applications			
15:00- Award ceremony, announcements and closing			