



3<sup>rd</sup>

International Meeting on

Deep Eutectic Systems

19-22

JUNE

2023

LISBON







The Organizing Committee of the 3<sup>rd</sup> International Meeting on Deep Eutectic Systems is very pleased to welcome you back to Lisbon. The Meeting will be held in Colégio Almada Negreiros of Universidade Nova de Lisboa, in the centre of Lisbon, between the 19-22<sup>th</sup> of June 2023. Following a second meeting, which was held online, we are happy to meet you all again in person. It is our expectation that this 3<sup>rd</sup> meeting continues to pave the series of fruitful meetings, which based on previous editions demonstrates the need to have a forum where experts from around the globe gather to discuss the latest developments in deep eutectic systems. From the bases of fundamental knowledge to the latest application developments, it is interesting to see how broad the spectrum of submitted contributions goes.

The organization committee aims to offer a unique opportunity, in an informal environment, to learn on the newest developments and discoveries in this area. This meeting is also a place for sharing knowledge, brainstorm new ideas and where the participants interact, network and build new bridges towards successful collaborations.

We hope that the 3<sup>rd</sup> IMDES will motivate and inspire you to pursue your work, and we could not finish without thanking you for the opportunity to organize such an interesting and high scientific level meeting.

The Organizing Committee 



## Committees

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3<sup>rd</sup> International Meeting on Deep Eutectic Systems

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3<sup>rd</sup> International Meeting on Deep Eutectic Systems

Participants of the 3IMDES are welcome to submit their work to the Special Issue  
**“Advanced Research on Natural Deep Eutectic Solvents”** in **Molecules** by MDPI,  
with a *300 CHF discount* in APC.

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IMPACT FACTOR **4.927** Indexed in: **PubMed**

Advanced Research on Natural Deep Eutectic Solvents


**Guest Editors**  
Dr. Ana Rita Xavier De Jesus Gameiro, Dr. Rita Craveiro

**Deadline**  
30 November 2023

**Special Issue**

[mdpi.com/si/138966](https://mdpi.com/si/138966) Invitation to submit

Participants of the 3IMDES are welcome to submit their work to the Special Issue  
**“Topical Advisory Panel Members' Collection Series: Deep Eutectic Systems for Green Catalysis”** in **Catalysts** by MDPI, with a *20% discount* in APC.

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Topical Advisory Panel Members'  
Collection Series: Deep Eutectic Systems  
for Green Catalysis

**Guest Editors**  
Dr. Małgorzata Zakrzewska, Dr. Maja Molnar

**Deadline**  
15 August 2023

**Special Issue**

[mdpi.com/si/164060](https://mdpi.com/si/164060) Invitation to submit



## Program

	19 June	20 June		21 June		22 June	
9h00		Opening Session					
9h15				PL2- Samir Mitragotri		PL3- Gabriela Guillena	
9h30		PL1- Sona Raeissi					
9h45				OC18- Bagović		OC36- Calogera	
10h00		OC1- Triollo	Fundament.	OC19- Paul	Pharma	OC37- Cea Klapp	Extraction
10h15		OC2- Morineau		OC20- Lomba		OC38- Amusa	
10h30		OC3- van den Bruinhorst		OC21-Oliveira		OC39- Canales	
10h45		Coffee Break/ Poster Session		Coffee Break/ Poster Session		Coffee Break/ Poster Session	
11h00							
11h15		KN1- Leslie Boudesocque-Delaye		KN3- Lorenzo Guazzelli		KN5- Hemant Kayshap	
11h30			Extraction				Fundamentals
11h45		OC4- Viñas-Ospino		OC22- Álvarez		OC40- Haghbakhsh	
12h00		OC5- Damjanović		OC23- Gajardo-Parra	Biotech	OC41- Alhadid	
12h15		OC6- Mezetta		OC24- Craveiro			
12h30		OC7- Ardeza		OC25- Freitas		Closing Session (sponsored by Quinta do Monte Alegre)	
12h45				OC26-Lee			
13h00							
13h15		Lunch		Lunch			
13h30							
13h45							
14h00							
14h15		KN2- Anastasia Detsi		KN4- Franca Castiglioni	Pharma		
14h30							
14h45		OC8- Teixeira		OC27- Gameiro			
15h00		OC9- Di Pietro	Materials	OC28- Joules			
15h15		OC10- Juneja		OC29- Rocha			
15h30		OC11- Daskalopoulou		OC30- Yagmur	Extraction		
15h45		OC12- Edler		OC31- Chagnolleau			
16h00		Coffee Break/ Poster Session		Coffee Break/ Poster Session			
16h15							
16h30		OC13-Cea-Klapp		OC32-Vigier			
16h45		OC14- Shayestehpour	Fundamentals	OC33- Anugwom	Biotech		
17h00		OC15- Khokhar		OC34- Kovács			
17h15		OC16- Russina		OC35-Bathke			
17h30		OC17- Alencar					
17h45							
18h00	Welcome Cocktail/ Registration	Team Building		Gala Dinner			
20h00							

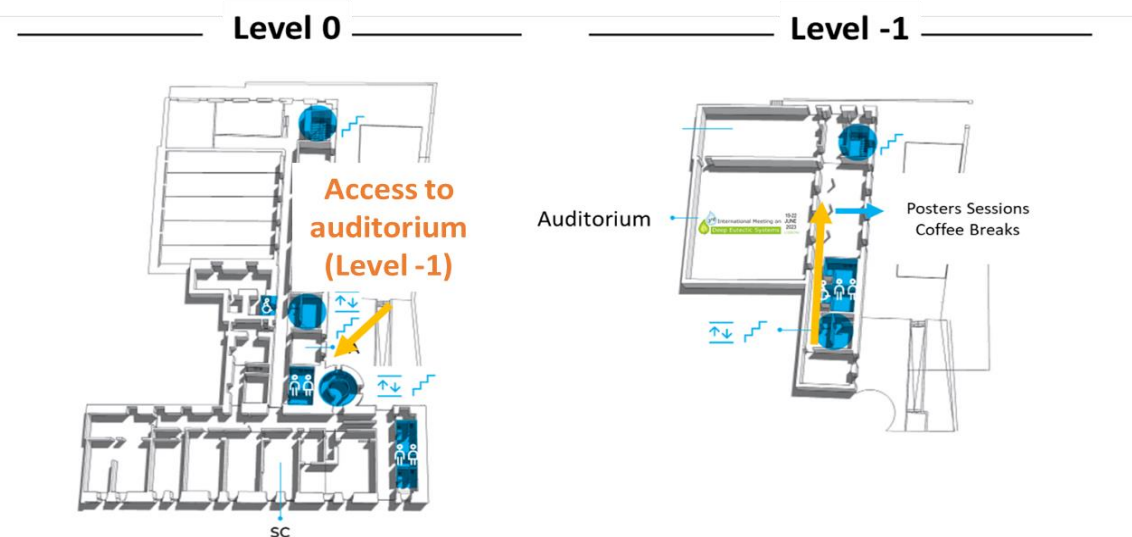


**Registration, Welcome Cocktail and Lunches** - Main atrium inside Colégio Almada Negreiros (Level 1)

**Team Building activity** - Main Gardens at the entrance of the Colégio Almada Negreiros

**Conference Auditorium, Poster Sessions and Coffee Breaks** - Level -1 (accessible by lift or stairs)

**Transportation to and from Gala Dinner** - Meeting place at the main entrance of Universidade NOVA de Lisboa (Reitoria side)



**Wi-Fi credentials:**

User: eduroam3@fcsn.unl.pt

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## Table of Contents

### PLENARY LECTURES

- PL1. *Don't Shy Away from Thermodynamics: DES Physical Property Calculations by the Group Contribution Approach*  
Sona Raeissi, School of Chemical and Petroleum Engineering, Shiraz University, Iran
- PL2. *Deep Eutectic Systems for Therapeutic Applications*  
Samir Mitragotri, John A. Paulson School of Engineering & Applied Sciences, Wyss Institute, Harvard University
- PL3. *Enabling Circular Chemistry by combining DES as reaction media and haloarcheas for their bioremediation*  
Gabriela Guillena, Departamento de Química Orgánica and Instituto de Síntesis Orgánica (ISO), Universidad de Alicante, Spain

### KEYNOTE LECTURES

#### 20<sup>th</sup> June

- KN1. *NaDES for biomass valorization: process innovation as a key point*  
Leslie Boudesocque-Delavel, Tours University, France (Louise Van Gheluwe, Solène Odou, Soukaina Hilali, Iron Mike Ardeza, Laura Wils, Barbara Clément-Larosière, Emilie Munnier, Leslie Boudesocque-Delaye)
- KN2. *Exploring the potential of Natural Deep Eutectic Solvents for the development of innovative materials with enhanced bioactivity*  
Anastasia Detsi, Laboratory of Organic Chemistry, School of Chemical Engineering, National Technical University of Athens, Greece (I. Pitterou, A. Tzani, A. Malliaraki, A. Sklapani, Christina Fountzoula, Anastasios Kriembardis, A. Detsi)

#### 21<sup>st</sup> June

- KN3. *Deep eutectic solvents and ionic liquids: long-lasting misunderstanding or possible future marriage? An insight into their relationship*  
Lorenzo Guazzelli, Dipartimento di Farmacia, University of Pisa, Italy
- KN4. *Eutectogels as "smart" drug delivery systems*  
Franca Castiglione, Department of Chemistry, Materials and Chemical Engineering "Giulio Natta", Politecnico di Milano, Italy (F. Castiglione, V. Vanoli, J. Pietrowska, M. E. Di Pietro, A. Mele)

#### 22<sup>nd</sup> June

- KN5. *Microstructure of Deep Eutectic Solvents*  
Hemant Kashyap, Department of Chemistry, Indian Institute of Technology Delhi, India (Akshay Malik, Mrityunjay K. Jha, Hemant K. Kashyap)



## ORAL PRESENTATIONS

20<sup>th</sup> June

### Session 1- Fundamentals (10h00-10h45),

- OC1. *Supramolecular cyclodextrin-based DES: From self-organization to molecular recognition*, Alessandro Triolo\*, Sophie Fourmentin, Emanuela Mangiacapre, Fabrizio Lo Celso, Olga Russina\*, Istituto Struttura della Materia- Consiglio Nazionale delle Ricerche (ISM-CNR)
- OC2. *Glassy Dynamics, Ionic Conduction and Dipolar Relaxation of DESs: What Can We Learn from Broadband Dielectric Spectroscopy?* Claire D'Hondt, Benjamin Malfait, Aicha Jani, Denis Morineau\*, \*Institute of Physics of Rennes, CNRS- University of Rennes
- OC3. *Defying decomposition of archetypal deep eutectic solvent constituents*, Adriaan van den Bruinhorst\*, Jocasta Avila, Martin Rosenthal, Manfred Burghammer, Alexey Melnikov, Ange Pellegrino, Nithavong Cam, Margarida Costa Gomes, \*Ecole Normale Supérieure de Lyon and CNRS

### Session 2- Extraction (11h45-12h45)

- OC4. *Current Approach for Carotenoids Extraction Using Hydrophobic Deep Eutectic Solvents*, Adriana Viñas-Ospino\*, Daniel López-Malo, Jesús Blesa, María José Esteve, Ana Frígola, \*Nutrition and Food Chemistry, University of Valencia
- OC5. *Deep Eutectic Solvents for Determination and Recovery Of Tartaric Acid From Winery Residues*, Anja Damjanović\*, Manuela Panić, Marina Cvjetko Bubalo, Kristina Radošević, Karin Kovačević Ganić, Natka Ćurko, Marina Tomašević, Ivana Radojčić Redovniković, \*Faculty of Food Technology and Biotechnology, University of Zagreb
- OC6. *Valorisation of food industry wastes by exploiting Natural Deep Eutectic Solvents (NADES)*, Angelica Mero, Andrea Mezzetta\*, Lorenzo Guazzelli, \*Department of Pharmacy, University di Pisa
- OC7. *Eutectic matrices for bioactive compounds valorization and formulation: carotenoids as case study*, Iron Mike Ardeza\*, Clément Wahl, Xavier Perse, Emilie Munnier, Leslie Boudesocque-Delaye, \*Université de Tours



### Session 3- Materials (14h45-16h00)

- OC8. *Impact of DES on Metal-Organic Framework Synthesis and Properties*, Michaël Teixeira\*, Renata A. Maia, Benoît Louis, Stéphane A. Baudron, \*University of Strasbourg-CNRS
- OC9. *Hydrophobic Eutectics and Eutectogels: a Fertile Playground for Structural and Dynamic Studies*, M. E. Di Pietro\*, G. de Araujo Lima e Souza, V. Vanoli, F. Castiglione, A. Mele, Department of Chemistry, Materials and Chemical Engineering "Giulio Natta", Politecnico di Milano
- OC10. *Classifying deep eutectic solvents for polymer solvation via intramolecular dimer formation*, Shreya Juneja\*, Siddharth Pandeya, \*Department of Chemistry, Indian Institute of Technology Delhi
- OC11. *Redox Properties of Copper Ions in Ionic Liquids and Deep Eutectic Solvents*, Evangelia Daskalopoulou\*, Jennifer M. Hartley, Guillaume Zante, Rodolfo Marin Rivera, Andrew P. Abbott, \*School of Chemistry, University of Leicester
- OC12. *Self-assembly and Mesostructure Formation in Type IV Deep Eutectic Solvents*, Iva Manasi, Karen J Edler\*, Elly Bathke, \*Department of Chemistry University of Bath; Center for Analysis and Synthesis, Department of Chemistry, Lund University

### Session 4- Fundamentals (16h30-17h45)

- OC13. *Surface tension of glycol-based eutectic solvents in water*, Aravena, P., Cea-Klapp, E.\*, Gajardo-Parra, N., Held, C, Garrido, J. M., Canales, R. I., \*Departamento de Ingeniería Química, Universidad de Concepción
- OC14. *Towards rational design of deep eutectic systems: from empirical force fields to machine learning interatomic potentials*, Omid Shayestehpour\*, Stefan Zahn, \*Leibniz Institute of Surface Engineering, Leipzig
- OC15. *Investigation of Lanthanide Metal-Based Deep Eutectic Solvents and Their Potential as Solubilizing Media*, Vaishali Khokhar\*, Siddharth Pandeya, \*Department of Chemistry, Indian Institute of Technology Delhi
- OC16. *Water-based DES: Properties and Opportunities*, Emanuela Mangiacapre, Fabrizio Lo Celso, Alessandro Triolo, Olga Russina\*, \*Chemistry Dept. - University of Rome Sapienza
- OC17. *Accurate description of the thermophysical properties of Choline Chloride-Based Deep Eutectic Solvents and their aqueous mixtures using soft-SAFT EoS*, Luan V.T.D. Alencar\*, Frederico W. Tavares, Fèlix Llovell. \* Federal University of Rio de Janeiro; Department of Chemical Engineering, ETSEQ, Universitat Rovira i Virgili



**21<sup>st</sup> June**

**Session 1- Pharma (09h45-10h45)**

- OC18. *Rationale Design of Deep Eutectic Solvents for Improvement of APIs properties*, Martina Bagović\*, Kristina Radošević, Manuela Panić, Marina Cvjetko Bubalo, Ivana Radojčić Redovniković, \*Faculty of Food Technology and Biotechnology, University of Zagreb
- OC19. *Quantum Chemical Studies of Deep Eutectic Solvents as Mucus Modulating Agents for Enhanced Drug Delivery*, Nabendu Paul\*, Anushka Raj Lakshmi, Tamal Banerjee, \*Department of Chemical Engineering, IIT Guwahati
- OC20. *Solubility Enhancement of drugs using Deep Eutectic Systems*, Laura Lomba\*, Alejandra Polo, Álvaro Werner, Beatriz Ginera, \*Facultad de Ciencias de la Salud, Universidad San Jorge; Instituto Agroalimentario de Aragón-IA2
- OC21. *Advances in Unravelling the Specific Cytotoxic Action of THEDES Towards Colorectal Cancer Cells Using a Metabolome Analysis Approach*, Filipe Oliveira\*, Filipa Amaro, Joana Pinto, Paula Guedes de Pinho, Ana Rita C. Duarte, \*LAQV/REQUIMTE, Department of Chemistry, Nova School of Science and Technology

**Session 2- Biotechnology (11h45-13h00)**

- OC22. *Efficient eutectic mixtures for biocatalysis reactions. From waste oil to biodiesel*, Maria S. Álvarez\*, Francisco J. Deive, Ana Rodríguez, María A. Longo, \*Department of Chemical Engineering, Vigo
- OC23. *Insights Into Deep Eutectic Solvents Impact On Formate Dehydrogenase Kinetics And Folding Stability*, Nicolas F. Gajardo-Parra\*, Gabriel Rodriguez, Esteban Cea-Klapp, Andres Arroyo-Avirama, Roberto Canales, José Matías Garrido, Gabriele Sadowski, Christoph Held, \*Laboratory of Thermodynamics, Department of Biochemical and Chemical Engineering, TU Dortmund
- OC24. *Membrane Design using Deep Eutectic Systems for CO<sub>2</sub> separation processes*, Rita Craveiro\*, Ana Balugas, Ana Rita C. Duarte, Luísa A. Neves, Alexandre Paiva, \*LAQV@REQUIMTE, Departamento de Química, Nova School of Science and Technology
- OC25. *Eutectic mixtures for enzymatic catalyzed reactions*, David S. Freitas\*, Artur Cavaco-Paulo, Carla Silva, \*Centre of Biological Engineering, University of Minho; LABBELS - Associate Laboratory
- OC26. *Deep Eutectic Solvent-based Preparation of Chitin-based Biomaterials: Effects of Deep Eutectic Solvent on Production and Properties of the Materials*, Danbi Won, Jeongmi Lee\*, Seulgi Kang, Ke Li, Hireem Kim, Boyeon Bae, Yua Kang, \*School of Pharmacy, Sungkyunkwan University



### Session 3- Pharma/Extraction (14h45-16h00)

- OC27. *Alternative media for ocular drugs based on Natural Deep Eutectic Systems*, Célia Sarmiento, Hugo Monteiro, Alexandre Paiva, Ana Rita C. Duarte, Ana Rita Jesus, \*LAQV@REQUIMTE, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa
- OC28. *Characterization of eutectic mixtures of sugars and sugar-alcohols for cryopreservation*, Adam Joules\*, Tessa Burrows, Peter I Dosa, Allison Hubel, \*Hasselmo Hall, Minneapolis
- OC29. *NADES-based cork extractives as green ingredients for cosmetics and textiles*, Diana Rocha\*, Artur Cavaco-Paulo, Carla Silva, \*Centre of Biological Engineering University of Minho; LABBELS - Associate Laboratory
- OC30. *Modulation of Spirulina Extraction using Octanoic Acid-Based NaDES with Respect to COSMO-RS Predictions*, Mervé Yagmur\*, Barbara Clément-Larosière, Bénédicte Montigny, Johan Jacquemin, Leslie Boudesocque-Delaye, \*Faculté de Pharmacie, Université de Tours
- OC31. *Sustainable extraction of perfumery plants using deep eutectic solvents and ionic liquids*, Jean-Baptiste Chagnoleau\*, João A. P. Coutinho, Xavier Fernandez, Nicolas Papaiconomou, \* Université Cote d'Azur, CNRS

### Session 4- Biotechnology (16h30-17h30)

- OC32. *Catalytic hydrogenation of xylose using DES as a solvent*, Naseeb Ullah, François Jérôme, Karine De Oliveira Vigier\*, \*IC2MP-University of Poitiers, CNRS
- OC33. *Low Temperature Biomass Deconstruction using a Metal Salt Hydrate based Deep Eutectic Solvent (DES)*, Ikenna Anugwom\*, Mari Kallioinen-Mänttari, Department of Separation Science, LUT School of Engineering Science
- OC34. *Deacetylation of Mannosylerythritol Lipids in Hydrophobic Natural Deep Eutectic Solvents*, Attila Kovács\*, Jonas Cassimon, Iris Cornet, Erik C. Neyts, Pieter Billen, \*iPRACS research group, University of Antwerp
- OC35. *Surfactant Self Assembly in Halogen Free Deep Eutectic Systems*, Elly K. Bathke\*, Sylvain Prévost, Karen J. Edler, Lund University, Sweden



**22<sup>nd</sup> June**

**Session 1- Extraction (09h45-10h45)**

- OC36. *Propeline: A new Candidate for Precious Metal Recovery*, Calogera Bertoloni\*, Vitalys Mba Ekomo, Stéphanie Michel, Emmanuel Billy, Hakima Mendil Jakani, Denis Menut, Thomas Dumas, Eric Meux, François Lopicque, Sophie Legeai, \*Institut Jean Lamour UMR CNRS, Université de Lorraine
- OC37. *Separation of furfuryl alcohol from water using hydrophobic deep eutectic solvents*, Cea-Klapp, E.\*, Arroyo-Avirama, A. F., Ormazábal-Latorre, S., Gajardo-Parra, N. F., Marzioletti, T., Held, C., Canales, R. I., Garrido, J. M., \*Departamento de Ingeniería Química, Universidad de Concepción
- OC38. *Screening of Acidic Deep Eutectic Solvents for Valuable Metals Extraction from Wasted Lithium-ion Batteries*, Hussein K. Amusa\*, Ahmad S. Darwish, Hassan A. Arafata, Enas M. Nashef, \*Department of Chemical Engineering, Khalifa University of Science and Technology; Center for Membranes and Advanced Water Technology, Khalifa University
- OC39. *Glycol-based Eutectic Solvents for Separating Methoxyphenols from Aliphatic Solvents*, Ormazábal-Latorre, S., Arroyo-Avirama, A., Gajardo-Parra, N., Garrido, J.M., Held, C., Canales, R.I.\*, \*Departamento de Ingeniería Química y Bioprocesos, Pontificia Universidad Católica de Chile; Millenium Nuclei on Catalytic Processes towards Sustainable Chemistry (CSC)

**Session 2- Fundamentals (11h45-12h15)**

- OC40. *Thermal conductivity modelling of Deep Eutectic Solvents by atomic and group contribution models*, Reza Haghbakhsh\*, Fatemeh Soltani, Sona Raeissi, \*Department of Chemical Engineering, Faculty of Engineering, University of Isfahan; LAQV@EQUIMTE, Departamento de Química da Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa
- OC41. *Design of deep eutectic solvents: A priori or a posteriori information?* Ahmad Alhadid\*, Liudmila Mokrushina, Mirjana Minceva, \*Biothermodynamics, TUM School of Life Sciences, Technical University of Munich



## POSTER PRESENTATIONS

21<sup>st</sup> June

### Fundamentals

- P1. *Origin of Structural and Dynamic Heterogeneity in DL-menthol based Hydrophobic Deep Eutectic Solvents*, Akshay Malik\*, Hemant K. Kashyap, \*Department of Chemistry Indian Institute of Technology Delhi
- P2. *Enthalpies of adding water to water: NADES mixtures*, Lamya Al Fuhaid, Maria F. Nava-Ocampo, Robert Verpoorte, Young Choi, Szilárd S. Bucs, Geert-Jan Witkamp, Andreia S. Lamya Al Fuhaid\*, \*Water Desalination and Reuse Center, King Abdullah University of Science and Technology
- P3. *In search of parameters that can help explain the high solubility capacity of Natural Deep Eutectic Systems*, Cláudio C. Fernandes\*, Reza Haghbakhsh, Ana Rita C. Duarte, Alexandre Paiva, \*LAQV@REQUIMTE, Departamento de Química, Nova School of Science and Technology
- P4. *Modeling the viscosity of binary eutectic systems at different compositions and temperatures*, Daili Peng\*, Zhen Yu, Ahmad Alhadid, Mirjana Minceva, \*Biothermodynamics, TUM School of Life Sciences, Technical University of Munich
- P5. *Confining Deep Eutectic Solvents in Nanopores: Insight into Thermodynamics and Chemical Activity*, Benjamin Malfait, Aicha Jani, Denis Morineau\*, \*Institute of Physics of Rennes, CNRS-University of Rennes
- P6. *Activity Coefficient Acquisition through Thermodynamics-Informed Active Learning: A Case-Study of Phase Diagram Construction*, Dinis O. Abranches\*, Edward J. Maginn, Yamil J. Colón, \*Department of Chemical and Biomolecular Engineering, University of Notre Dame
- P7. *Type V deep eutectic solvents: Design and applications*, Dinis O. Abranches\*, João A. P. Coutinho, \*CICECO - Aveiro Institute of Materials, Department of Chemistry, University of Aveiro
- P8. *Chemical-physical and structural properties of Choline Chloride:water systems: the aquoline DES*, Emanuela Mangiacapre\*, Franca Castiglione, Fabrizio Lo Celso, Martin Brehm, Alessandro Triolo,\* and Olga Russina, \*Chemistry Dept. - University of Rome Sapienza
- P9. *Evaluation of the structural transformations of the system Reline:water by Molecular Dynamics*, Hugo Monteiro\*, Alexandre Paiva, Ana Rita C. Duarte, Nuno Galamba, \*LAQV@REQUIMTE, Departamento de Química, Nova School of Science and Technology



- P10. *Analysis of the Formation Mechanism of Choline-based Deep Eutectic Solvents Using Density Functional Theory*, Mahula Santra\*, Dharamashi Rabari, Deepak Kunzru, \*School of Engineering and Applied Science, Ahmedabad University
- P11. *Effect of lithium salt on fluorescence quenching in glycerol: a comparison with ionic liquid/deep eutectic solvent*, Manish Kumara\*, Siddharth Pandey, \*Department of Chemistry, Indian Institute of Technology Delhi
- P12. *Prediction of viscosities of Deep Eutectic Solvents by machine learning + group contribution hybrid models*, Reza Haghbakhsh\*, Ahmadreza Roosta, Sona Raeissi, \*Department of Chemical Engineering, Faculty of Engineering, University of Isfahan; LAQV@REQUIMTE, Departamento de Química da Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa
- P13. *A computational modelling approach for an ad-hoc choice of the optimal DES for gas refrigerant recovery*, Luan V.T.D. Alencar, Frederico W. Tavares, Rafael Gonzalez-Olmos, Fèlix Llovell\*, \*Department of Chemical Engineering, ETSEQ, Universitat Rovira i Virgili

## Materials

- P14. *Poly(3-hydroxybutyrate-co-3-hydroxyvalerate) Electrospun Nanofibers Containing Natural Deep Eutectic Solvents Exhibiting a 3D Rugose Morphology and Charge Retention Properties*, Ahmet Ozan Basar\*, Cristina Prieto, María Pardo-Figuerez, Jose M. Lagaron, \*Novel Materials and Nanotechnology group, Institute of Agrochemistry and Food Technology
- P15. *Mixed micelle formation by sodium dodecylsulfate and dodecyltrimethylammonium bromide in aqueous ionic liquid media*, Anjali Sangwana\*, Siddharth Pandeya, \*Department of Chemistry, Indian Institute of Technology Delhi
- P16. *Deep eutectic solvents and dilutions there of as sustainable electrolytes in supercapacitors*, Laura González-Aguilera, Francisco del Monte\*, María Concepción Gutiérrez, María Luisa Ferrer, \*Instituto de Ciencia de Materiales de Madrid
- P17. *Deep eutectic solvents for the recovery of metals from the cathode of spent Li-ion batteries*, Francisco del Monte\*, María Luisa Ferrer, María Concepción Gutiérrez, \*Instituto de Ciencia de Materiales de Madrid
- P18. *Interfacial Chemical Reactions in Deep Eutectic Solvents*, Iva Manasi\*, Mario Campana, Daniel T. Bowron, Karen J. Edler, \*Department of Chemistry, University of Bath





- P19. *Deep Eutectic Solvent-based Preparation of Chitin-based Biomaterials: Effects of Deep Eutectic Solvent on Production and Properties of the Materials*, Danbi Won, Jeongmi Lee\*, Seulgi Kang, Ke Li, Hireem Kim, Boyeon Bae, Yua Kang, \*School of Pharmacy, Sungkyunkwan University
- P20. *The chemical stability of common deep eutectic solvents with oxidizing agents used in gold hydrometallurgy*, Julien André\*, Lenka Svetocova, Marine Audouin, Harold Le Tulzo, Jérôme Daviot, Éric Chainet, \*Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble INP
- P21. *Electrolytes for Supercapacitors based on Deep Eutectic Solvents Obtained from Aqueous Salts Hydrates*, Boren Xu, María Luisa Ferrer\*, María Concepción Gutiérrez, Francisco del Monte, \*Instituto de Ciencia de Materiales de Madrid
- P22. *Sustainable and Straightforward C–H Activation Protocols in Deep Eutectic Solvents*, Nerea González-Gallardo\*, Xavier Maset, Beatriz Saavedra, Diego J. Ramón, Gabriela Guillena, \*Departamento de Química Orgánica and Instituto de Síntesis Orgánica (ISO), Facultad de Ciencias Universidad de Alicante
- P23. *Thermophysical Characteristics of Phosphonium Eutectic Nanofluid Based on MWCNT: A New Heat Transfer Media for Solar Desalination System*, Nipu Kumar Das\*, Tamal Banerjee, \*Department of Chemical Engineering, Indian Institute of Technology Guwahati
- P24. *Eutectogels as Drug Delivery Systems: An NMR Study*, V. Vanoli\*, M.E. Di Pietro, A. Mele, F. Castiglione, \*Department of Chemistry, Materials and Chemical Engineering “Giulio Natta”, Politecnico di Milano
- P25. *One Step LiNi<sub>0.33</sub>Mn<sub>0.33</sub>Co<sub>0.33</sub>O<sub>2</sub> Cathode Active Material Recovery From Ethaline: Leaching, Co-precipitation, Annealing And Successful Reuse As Cathodic Material*, Delphine Yetim, Youcef Karar\*, Jean-Claude Leprêtre, Lenka Svecova, \*Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble INP

## Pharma

- P26. *Study of the skin and gastrointestinal membrane permeability of ascorbic acid in fourteen different NADES*, Clara Gómez-Urios, Adriana Viñas-Ospino\*, Ana Frígola, María José Esteve, Daniel López-Malo, Jesús Blesa, \*Nutrition and Food Science Area, Faculty of Pharmacy, University of Valencia
- P27. *Membrane-assisted nanoemulsification: Fundamentals and biomedical applications of hydrophobic deep eutectic solvents based nanoemulsions*, Usman T. Syeda, Victor Sebastian, Lidietta Giorno, João Crespo, Carla Brazinha\*, \*LAQV@Requimte, Department of Chemistry, NOVA School of Science and Technology, FCT NOVA, NOVA University of Lisbon



- P28. *Increasing the solubility of active pharmaceutical ingredients using deep eutectic systems*, Inês João Ferreira\*, Ana Roda, Ana Rita C. Duarte. \*LAQV@REQUIMTE, Department of Chemistry, School of Science and Technology, NOVA University Lisbon
- P29. *Broccoli Extracts Obtained Using Deep Eutectic Solvents With Potential Antiproliferative Activity*, Joana Pereira\*, Marta Marques, Isabel Cardoso, Alexandre Paiva, Ana Rita C. Duarte, \*LAQV@REQUIMTE, Chemistry Department, NOVA School of Science & Technology
- P30. *Design and Characterization of Gels and Films based on Biopolymers for Transdermal Drug Delivery using Deep Eutectic Systems*, João Lourenço\*, Rita Craveiro, Luísa A. Neves, \*LAQV@REQUIMTE, Departamento de Química, Nova School of Science and Technology, Universidade NOVA de Lisboa
- P31. *Sustainability of the preparation and application of THEDES*, Martina Bagović\*, Manuela Panić, Višnja Gaurina Srček, Marina Cvjetko Bubalo, Ivana Radojčić Redovniković, Kristina Radošević, \*Faculty of Food Technology and Biotechnology, University of Zagreb
- P32. *Extending the shelf-life of red blood cells using natural deep eutectic systems*, Liane Meneses\*, Ana Rita Jesus, Alexandre Paiva, Ana Rita C. Duarte, \*LAQV@REQUIMTE, Departamento de Química, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa
- P33. *A Novel Aerogel From A Collagen-NADES Extract For Potential Topical Biomedical Applications*, Miguel Batista\*, Ana Rita Duarte, Baldur Schroeter, Naiara Fernández, Frédéric Gaspar, Maria do Rosário Bronze, Pavel Gurikov, \*iBET, Instituto de Biologia Experimental e Tecnológica; LAQV@REQUIMTE, Departamento de Química, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa
- P34. *Ecotoxicity of glycerol-derived deep eutectic systems using *Palaemon varians* as a biological model*, Pilar Garralaga\*, Ines Ferreira, Elisabet Pires, Mário Diniz, Ana Rita C. Duarte, Laura Lomba, \*Universidad San Jorge



**21<sup>st</sup> June**

**Extraction and Separation**

- P35. *Selective Extraction of Carotenoids from Novel Bioengineered Algae Using Natural Deep Eutectic Solvents*, Lamya Al Fuhaid\*, Najeh Kharbatiaa Andreia Farinha, Gordon B. Wellman, Kyle J. Lauersen, Robert Verpoorte, Young H. Choi, Geert-Jan Witkamp, Luca Fortunato, \*Division of Biological and Environmental Science and Engineering, King Abdullah University of Science and Technology
- P36. *Development and optimization of a green extraction process of Greek Wild Rose (Rosa Canina L.) rosehip shells*. D.A. Tzani, K Nanou, Aggeli, G. Stavropoulos, A. Detsi\*, \*Laboratory of Organic Chemistry, School of Chemical Engineering, National Technical University of Athens
- P37. *Innovative strategy for aroma stabilisation using green solvents: supercritical CO<sub>2</sub> extracts of Satureja montana dispersed in natural deep eutectic solvents*, Jelena Vladić\*, Strahinja Kovačević, Krunoslav Aladić, Stela Jokić, Sanja Podunavac-Kuzmanović, Katarina Šavikin, Jelena Živković, Igor Jerković, Ana Rita Duarte, \*Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa; Faculty of Technology, University of Novi Sad
- P38. *Regeneration of deep eutectic solvents with tetramethyl oxolane – a bio-derived solvent*, Mahsa Gholami\*, Jochem M. Tijburg, Boelo Schuur, \*University of Twente
- P39. *NADES-US coupled extraction of Graševina pomace polyphenols*, Panić Manuela\*, Damjanović Anja, Škegrov Marko, Dujmić Filip, Brnčić Mladen, Radošević Kristina, Cvjetko Bubalo Marina, Radojčić Redovniković Ivana, \*Faculty of Food Technology and Biotechnology, University of Zagreb
- P40. *Hydrophobic NADES for trace metal removal from water*, Ana Rousseva, Mariana E. Rodrigues\*, Lohail K. Ashqer, Lamya Al Fuhaid, Fernanda Tavares, Robert Verpoorte, Young Choi, Luca Fortunato, Johannes Vrouwenvelder, Geert-Jan Witkamp, Andreia S. F. Farinha, \* Water Desalination and Reuse Center, King Abdullah University of Science and Technology
- P41. *Eutectic Solvents for Inorganic Contaminants Analysis Employing Plasma Sources*, Mario H. Gonzalez\*, Sabrina S. Ferreira, Éder R. Paganini, Rafaela S. Lamarca, Ana P. R. Santana, Taciana G.S. Guimarães, Andrea Oliveira, Clarice D.B. Amaral, \*Department of Chemistry and Environmental Science, National Institute for Alternative Technologies of Detection, Toxicological Evaluation and Removal of Micropollutants and Radioactives (INCT-DATREM), São Paulo State University
- P42. *Ultrasound-assisted solid-phase matrix dispersion employing AADES (UA-MSPD/AADES) for As determination by ICP-MS*, Taciana G. S. Guimarães, Mario



- H. Gonzalez\*, Floriatan Santos Costa, Ana P. R. Santana, Daniel F. Andrade, Andrea Oliveira, Clarice D. B. Amaral, \*Department of Chemistry and Environmental Science, National Institute for Alternative Technologies of Detection, Toxicological Evaluation and Removal of Micropollutants and Radioactives (INCT-DATREM), São Paulo State University
- P43. *Deep Eutectic Systems: A sustainable approach on the valorisation of fruit and vegetable wastes*, Marques M.\*, Pereira J., Duarte A. R.C., Paiva A., \*LAQV@REQUIMTE, Departamento de Química, Nova School of Science and Technology
- P44. *Green keratin extraction from duck feathers using a deep eutectic solvent*, Sandra Alvarez\*, Eduardo Robles, \*University of Pau and the Adour Region.
- P45. *Separation of terpenoids from essential oils using in situ extraction based on deep eutectic solvents*, Sile He, Kyung Ho Row, Weiyang Tang\*, \*Department of Chemistry and Chemical Engineering, Education and Research Center for Smart Energy and Materials, Inha University
- P46. *A Sustainable Synthesis of Atenolol in Deep Eutectic Solvents*, Debora Procopio\*, Carlo Siciliano, Assunta Perri, Gabriela Guillena, Diego J. Ramón, Maria Luisa Di Gioia, \*Department of Pharmacy, Health and Nutritional Sciences, University of Calabria
- P47. *Carbon dioxide solubility in type V deep eutectic solvents*, Ahmad Alhadid\*, Javid Safarov, Liudmila Mokrushina, Karsten Müller, Mirjana Minceva, \*Biothermodynamics, TUM School of Life Sciences, Technical University of Munich (TUM)
- P48. *Exploring Novel Agro-based Deep Eutectic Solvents for Food Packaging Films*, Bhavna Alke\*, Usman T. Syed, Vitor Alves, Suzana Nunes, João Crespo, Carla Brazinha, \*LAQV@Requimte, Department of Chemistry, NOVA School of Science and Technology, FCT NOVA
- P49. *Comparative Study of Spectrophotometric Methods for Quantification of Chlorogenic Acid in NADES*, Gabriela S. Macello Ramos, Fernanda de S. Bezerra\*, Maria Gabriela B. Koblitz, \*Federal University of the State of Rio de Janeiro
- P50. *Antioxidant activity of NADES extracts of sunflower meal*, Fernanda de S. Bezerra\*, Gabriela S. Macello Ramos, Maria Gabriela B. Koblitz, \*Federal University of the State of Rio de Janeiro



- P51. *Haloarchaea as molecular factories: from DESs to the production of biotechnological compounds*, Martínez, Guillermo\*, Martínez-Espinosa, Rosa María, Guillena Townley, Gabriela, \*Biochemistry and Molecular Biology Division, Agrochemistry and Biochemistry Department, Faculty of Sciences and Multidisciplinary Institute for Environmental Studies (IMEM), University of Alicante
- P52. *Protein Structure and Stability in Hydrated Betaine-based Deep Eutectic Solvents*, Gomes, I\*, Galamba, N., Paiva, A., \*BioISI - Biosystems and Integrative Sciences Institute, Faculty of Sciences of the University of Lisbon
- P53. *Eutectic mixtures as efficient solvent for microalgae cell disruption and extraction*, Ke Li\*, Seulgi Kang, Jingyan Chen, Danbi Won, Boyeon Bae, Yua Kang, Jeongmi Lee. \*School of Pharmacy, Sungkyunkwan University
- P54. *Deep Eutectic System as a catalytic medium in the synthesis of fuel additives*, Martina Sušjenka, Fran Prašnikar, Ana B. Paninho, Luz Fernandes, Ana V.M. Nunes, Ana R.C. Duarte, Maja Molnar, Małgorzata E. Zakrzewska\*, \*LAQV@REQUIMTE, Departamento de Química, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa
- P55. *Mimicking nature: design, preparation and applications of bioinspired deep eutectic solvents*, Marina Cvjetko Bubalo\*, Thanos Andreou, Mia Radović, Manuela Panić, Anja Damjanović, Ivana Radojčić Redovniković, \*Faculty of Food Technology and Biotechnology, Zagreb
- P56. *Stabilising Nicotinamide Cofactors in Deep Eutectic Solvents (DES)*, Mia Radović\*, Lucija Hok, Manuela Panić, Marina Cvjetko Bubalo, Robert Vianello, Ivana Radojčić Redovniković, \*Faculty of Food Technology and Biotechnology, Zagreb
- P57. *Accurate Prediction of Carbon Dioxide Capture by Deep Eutectic Solvents using Quantum Chemistry and a Neural Network*, Mood Mohan\*, Omar Demerdash, Blake A. Simmons, Jeremy C. Smith, Michelle K. Kidder, Seema Singh, \*Center for Molecular Biophysics, Oak Ridge National Laboratory; Deconstruction Division, Joint BioEnergy Institute, United States
- P58. *Effect of essential oil-based formulation on biopesticide activity*, Lana Dunan, Tara Malanga, Sylvain Benhamou, Nicolas Papaiconomou\*, Nicolas Desneux, Anne-Violette Lavoit, Thomas Michel, \*Université Côte d'Azur, CNRS
- P59. *Innovative eutectic systems for neutralizing malodorous compounds*, Nicolas Papaiconomou\*, Xavier Fernandez, \*Université Cote d'Azur, CNRS
- P60. *Effective VOC capture by hydrophobic deep eutectic solvents using static and dynamic processes*, P. Villarim\*, E. Genty, J. Zemmouri, Sophie Fourmentin, \*Unité de Chimie Environnementale et Interactions sur le Vivant (UCEIV), Université du Littoral-Côte d'Opale



- P61. *Use of Deep Eutectic Solvents for Systematic Valorization of Spent Coffee Ground*, Raffaella De Luca\*, Angelica Mero, Andrea Mezzetta, Lorenzo Guazzelli, Christian S. Pomellia, \*Department of Pharmacy, University of Pisa
- P62. *Experimental Investigation and Thermodynamic Modeling of Cannabidiol Solubility in Plant Oils and Hydrophobic Eutectic Systems*, Ahmad Alhadid, Simon Vlad Luca, Sahar Nasrallah\*, Mirjana Minceva, \*Biothermodynamics, TUM School of Life Sciences, Technical University of Munich
- P63. *Fortification of the biological activity of licorice by frying with honey, a natural deep eutectic solvent*, Shasha Kong\*, Pengyue Li, Robert Verpoorte, Yuntao Dai, \*Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences
- P64. *Evaluation of deep eutectic systems as anti-biofouling agents*, Sandro Amador\*, Susete Pinteus, Ana Rita C. Duarte, Alexandre Paiva, \*LAQV@REQUIMTE, Department of Chemistry, School of Science and Technology, NOVA University Lisbon



3<sup>rd</sup> International Meeting on Deep Eutectic Systems

## **NOTES**



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