

EMEC 1 ∞

CHEMISTRY TOWARDS AN INFINITE ENVIRONMENT

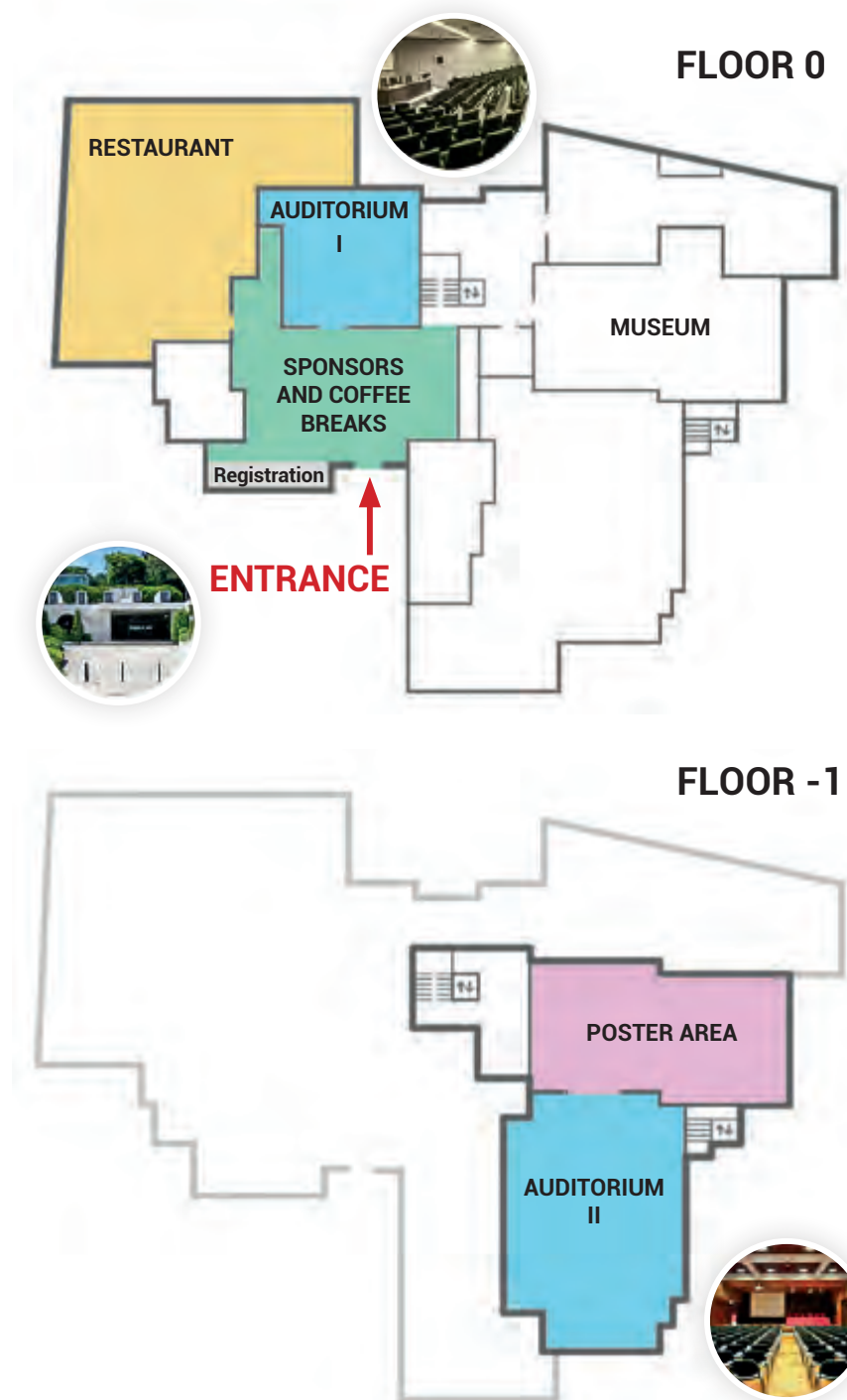
18th European Meeting on Environmental Chemistry

Porto 26-29th November 2017



Venue – Fundação Dr. António Cupertino de Miranda

Avenida da Boavista, 4245, 4150 – 639 Porto; GPS: N 41°9'54" | W 8° 40' 19"



November 26th	November 27th		November 28th		November 29th	
08:30 – 09:00 09:00 – 09:30 09:30 – 09:45 09:45 – 10:00 10:00 – 10:15 10:15 – 10:30	Participants Registration Opening ceremony Aud. II Diamond Sponsor – Prince Sultan Bin Abdulaziz International Prize for Water (<i>PSIPW</i>) PL #1 Damià Barceló Climate Changes, Water Scarcity, Emergent Contaminants and Other Stressors		Participants Registration PL #2 Despo Fatta-Kassinou Aud. II Considerations Related to Contaminants of Emerging Concern and Wastewater Reuse KN #3 Maria Llompart Recycled Tire Rubber in Playgrounds for Children and Football Fields: Health and Environmental Concern OP Env Tech #12 Jianan Li Aud. II The Use of <i>Spirodela Polyrhiza</i> in Batch Scale Constructed Wetlands to Remove PPCPs from Synthetic Wastewater OP Env Tech #13 Maria Celeiro Assessment of Different Photodegradation Strategies To Remove Multiclass UV Filters From The Aquatic Environment OP Env Tech #14 Carmen Mazón Effect of Sunlight and UV-C Disinfection Dose Irradiation on the Degradation of Organophosphorous Pesticide Dichlorvos		Participants Registration PL #3 Kevin Jones Aud. II Passive Sampling the Environment: Why, How and a Vision of the Future KN #5 Kurunthachalam Kannan Biomonitoring of Human Exposure to Environmental Chemicals OP Env Safe #3 Marta Silva Aud. II Synthesis and Environmental Fate Evaluation of New Nature-Inspired Antifouling Compounds OP Env Safe #4 Inês Bezerra Effects of Emerging Contaminants Detected in Drinking Water on Bacteria Tolerance to Antimicrobials OP Env Safe #5 Anne-Marie Delort H ₂ O ₂ Modulates the Energetic Metabolism of the <i>Cloud</i> Microbiome	
10:30 – 10:45	KN #1 Elia Psillakis Microextraction: An Ideal Platform to Analyse and Simulate the Environment		OP Env Monit #19 Triantafyllos Albanis Determination of Pharmaceuticals in Hospital and Municipal Wastewaters by Using LC-LTQ Orbitrap Mass Spectrometry OP Env Monit #20 Mónica Santos Development of an Analytical Methodology for the Analysis of Priority Cytostatics in Water		OP Env Tech #21 Paula Guedes Removal of PPCPs from Effluent Based on Electrochemical Process – Possibility of Further Use in Agriculture OP Env Tech #22 Paulo Augusto Exploring Magnetism as a Way to Decontaminate Wastewater and Leachates	
10:45 – 1:00	Coffee-Break & Exhibition		Coffee-Break & Exhibition		Coffee-Break & Exhibition	
11:00 – 1:30 11:30 – 11:45	Platinum Sponsor Aud. II Euan Ross (<i>Waters Corporation</i>) – The Analysis of Natural and Synthetic Estrogens at Low ppq Levels in Surface Water and Final Effluent Water by LC-ESI-MS/MS		Platinum Sponsor Aud. II Peter Abrahamsson (<i>Agilent Technologies</i>) – Using a Novel Accurate Mass MS/MS Library for the Qualitative Analysis of Environmental Samples		Platinum Sponsor Aud. II Juergen Wendt (LECO) – The Usage of Time-of-Flight Mass Spectrometry for Environmental Analysis	
11:45 – 12:00	OP Env Monit #1 Juan Francisco Facetti Aud. II Preliminary Characterization of MTBE in the Aquifer Patiño, Metropolitan Region of Asuncion, Paraguay	OP Env Tech #1 Amina Khaled Aud. I Photodegradation of Brominated Flame Retardants in Textiles from End of Life Vehicles (ELVs): Kinetic and Photoproducts Characterization	OP Env Tech #15 Joana Vilas Boas Aud. II Single Chamber Microbial Fuel Cell (SCMFC) using <i>Lactobacillus pentosus</i> biofilms	OP Env Monit #21 Patrícia Peixoto Aud. I Fast Methods for Screening Fluoroquinolones in Environmental Water	OP Env Safe #6 Rui Santos Aud. II PLASMAQUANT [®] MS a new potential tool for Iron Isotope Ratios determination in Biological Samples	OP Env Tech #23 Abuzar Kabir Aud. I Encapsulation of High Surface Area Carbonaceous Particles into Sol-gel Matrix and Their Use in Environmental Pollution Mitigation
12:00 – 12:15	OP Env Monit #2 Eleonora Conca Characterization and Temporal Evolution of the Inorganic Component of PM10 Collected at Ny-Ålesund (Arctica)	OP Env Tech #2 Rajae Chahboune Photochemical Processes for the Elimination of Nitrosomorpholine During Water treatment: Kinetic and Analytical studies	OP Env Tech #16 Paula Figueira Nutshells as Very Low Cost Sorbents for Contaminated Waters Treatment	OP Env Monit #22 Manuela Correia Assessment of 83 Pharmaceuticals in Wastewater Samples by UHPLC-MS/MS	OP Env Safe #7 Paulo Reis RIBE Assessed At An Inter-organismic Level In <i>Daphnia magna</i> Exposed To Low Doses Of Uranium Mine Effluent And Waterborne Uranium	OP Env Tech #24 Luísa Maia Formate Dehydrogenase-catalysed Carbon Dioxide Reduction: Aiming to Develop a Catalyst for Carbon Dioxide Utilisation
12:15 – 12:30	OP Env Monit #3 Francisco Cereceda-Balic Vehicle Emissions Impact on Snow Albedo Reduction in Los Andes Mountains. Study Case: Portillo, Chile	OP Env Tech #3 João Gomes Operating Conditions Optimization for Photocatalytic Ozonation of Parabens Using Ag-TiO ₂	OP Env Tech #17 Benigno Nóvoa Kinetics, Transformation and Toxicity of 1,3-di- <i>o</i> -tolylguanidine and 1,3-diphenylguanidine During Disinfection with Chlorine	OP Env Monit #23 Belen González-Gaya Optimizing a Clean Method for Environmental Samples: Antibiotics and Matrix Interferences in Marine Sediments, Water and Biota	OP Env Safe #8 Patrícia Palma Ecotoxicological Tools Used in the Assessment of the Ecological Status of Freshwater Systems: a Case-study of the Temporary River Brejo do Cagarrão (South of Portugal)	OP Env Tech #25 Maria Laura Tummino Green Waste Derived Substances Immobilized on SBA Silica: Adsorbing and Photosensitizing Properties Towards Metals and Organics
12:30 – 12:45	OP Env Monit #4 Miguel Velázquez Gómez Organic Contaminants in Indoor Dust: An Approach Through a GC-MS/MS method	OP Env Tech #4 Eneliis Kattel Degradation of Ceftriaxone in Aqueous Solution by Heterogeneous Photo-Activated Persulfate System	OP Env Tech #18 Elisabete Geraldos Eco-Friendly Non-Biocide-Release Coatings for Biofouling Prevention on Submerged Surfaces	OP Env Monit #24 Liliana Silva SSRIs Antidepressants in Marine Mussels from Atlantic Coastal Areas and Human Risk Assessment	OP Env Safe #9 Joana Lourenço Uranium Mining Legacy Sites: Genetic Effects of Metals and Low-Dose Radiation in Farm Animals Exposed to Contaminated Water and Foodstuffs	OP Env Tech #26 Cláudia Neves Immobilized Porphyrins as Photocatalysts for the Degradation of Metoprolol
12:45 – 13:00	OP Env Monit #5 Eran Tas Ozone Deposition Over Vegetation in the Eastern Mediterranean	OP Env Tech #5 Maria Conceição Amado Photocatalytic Reactor for Pharmaceutical Drugs and Pesticides Removal From Water, Using Thin Film CVD-Technology	OP Env Tech #19 Djilali Tassalit Photocatalysis And Adsorption Synergy For Simultaneous Removal Of Phenol And Acétamiprid Pollutants in Water	OP Env Monit #25 Tamara Gorena Evaluation of the Environmental Impact of High Pollution Load from an Industrial Complex using <i>Cyprinus macrocarpa</i> biomonitoring	OP Env Safe #10 Pavel Fojt Ecotoxicity Assessment of Cadmium Using Different Life Stages of the Terrestrial Gastropod <i>Helix aspersa aspersa</i>	OP Env Tech #27 Alaëddine Elhalile Synthesis, Characterization and Photocatalytic Performance of Mg-ZnO-AL ₂ O ₃ Nanocomposite for Degradation of Pharmaceutical Pollutants
13:15 – 14:15 14:15 – 14:45	Lunch		Lunch		Lunch	
14:45 – 15:00	KN #2 Pedro Jiménez-Guerrero Aud. I Using Chemistry Transport Models to Evaluate the Fate of Atmospheric Pollutants	OP Env Model #1 Gerhard Lammel Aud. I Monsoon Air Triggers Re-volatilization of Persistent Pollutants Stored in Soils in India	KN #4 Cristina Branquinho Aud. II Evaluating the Role of Urban Green Spaces in Improving Urban Sustainability: The case of Air Purification and of Climate Regulation	OP Sust Devel #1 André Pereira Aud. II Human Pharmaceuticals in Portuguese Rivers: the Impact of Water Scarcity in the Environmental Risk	OP Env Safe #11 Helena Soares Aud. II Additive Inhibitory Free Metal Ion Concentration Index: a New Method for Assessing Multi-Metal Contamination Risk on Freshwaters	OP Env Tech #28 ACE General Assembly (Aud. II)
15:00 – 15:15	OP Env Monit #6 Olga V. Polyakova Aud. II Novel Methods for Comprehensive Analysis of Environmental Samples: GCxGC-HR-TOFMS	OP Env Model #2 Noelia Domínguez-Moruco Combining Monitoring and Modelling Approaches for BaP Characterization Over a Petrochemical Area	OP Sust Devel #2 Klara Slezakova Ultrafine Particles in Ambient Air of Metropolitan Area of Porto: Levels and Risk Assessment	OP Env Monit #26 João Sousa Aud. I Spatiotemporal Monitoring Campaign of the Watch List Compounds in Ave and Sousa Rivers	OP Env Safe #12 Marilyne Pflieger Ecotoxicity of Biomass Burning Pollutants and Their Nitro Derivatives	OP AgroFood #1 Ana Martínez Piernas Aud. I Suspect-screening Strategy Applied To The Identification Of Transformation Products Of Carbamazepine In Lettuce And Soil Commodities
15:15 – 15:30	OP Env Monit #7 Regina Duarte A Primer on – Omics Strategy for Untargeted Profiling of Organic Aerosols: Lessons Learned and Future Challenges	OP Env Model #3 Luís Silva DFT Calculations on Climate Forcing and on Sustainable CO ₂ Conversion	OP Env Monit #27 Gabriela Varela Determination of Cardiac Drugs in Sludge by Ultra Performance Liquid Chromatography Followed by Tandem Mass Spectrometry	OP Env Monit #28 Polonca Trebse Identification of disinfection by-products formed within aquatic bromination of avobenzone	OP Env Safe #13 Ruth Pereira Ecosystem Services Provided by Soils Under Different Land Uses: Implications to Water Quality	OP Env Tech #29 Jan Schwarzbauer Molecular Indicators for Dockyard Works in Coastal Sediments of a Large Industrialized Port Area in Hainan Island, China
15:30 – 15:45	OP Env Monit #8 Isabel Brás Validation of ICP-MS Methodology for Quantification of 22 Elements in Wastewaters	OP Env Model #4 Lotfi Belkhir The DFT Modeling As A Partner Of Reprocessing Nuclear Waste. Rich Interplay Between Theory And Experience	OP Sust Devel #3 Mirco Volanti LCA Methodology: A Case Study Of The Industrial Production Of Terephthalic Acid From Renewable Sources	OP Env Monit #29 Jan Schwarzbauer Molecular Indicators for Dockyard Works in Coastal Sediments of a Large Industrialized Port Area in Hainan Island, China	OP Env Safe #14 Verónica Nogueira The Impact On Soil Biota of Leather From The Footwear Industry Treated With ZnO Nanomaterial: A Microcosm Study	OP Env Monit #30 Filipe Rocha Seaweed Analysis for the Determination of Volatile Methylsiloxanes in Coastal Areas in North of Portugal
15:45 – 16:00	OP Env Monit #9 Priscilla Rocío-Bautista Metal-Organic Frameworks: A New Generation of Sorbents for Solid-Phase Extraction	OP Env Model #5 Davide Vione Photodegradation of Sulfadiazine Under Conditions Significant for Surface Waters, and Inhibition by Organic Compounds	OP Env Safe #1 Anabela Francisco The Predicted Concentrations of Antibiotics in STPs in Portugal – A tool for the Microbial Community Resistance Research	OP Env Monit #31 Irene Aparicio Occurrence of Parabens and Bisphenol A in Sludge Stabilization Treatments: Anaerobic Digestion and Composting	OP Env Safe #13 Ruth Pereira Ecosystem Services Provided by Soils Under Different Land Uses: Implications to Water Quality	OP AgroFood #3 Carlos Ferreira Soil interactions of azotochelin and DPH and determination of iron induced chlorosis mending potential in soybean (glycine max)
16:00 – 16:15	OP Env Monit #10 Claudia Fontàs Can Polymer Inclusion Membranes be Used as an Integral Tool to Facilitate Environmental Monitoring? The Case of Hg	OP Env Model #6 Luca Carena Photoinduced Reactions in Sunlit Paddy-Field Water	OP Env Safe #2 Elena Bessonova LC/MS Determination of Anti-TB Drugs and Their Metabolites in Human Plasma for Optimization Therapeutic Treatment of Tuberculosis	OP Env Monit #31 Irene Aparicio Occurrence of Parabens and Bisphenol A in Sludge Stabilization Treatments: Anaerobic Digestion and Composting	OP Env Safe #14 Verónica Nogueira The Impact On Soil Biota of Leather From The Footwear Industry Treated With ZnO Nanomaterial: A Microcosm Study	OP AgroFood #4 Filipa Paulo How and Why Incorporation of Microencapsulated Bioactive Ingredients in Foods?
16:15 – 16:45 16:45 – 17:00	Coffee-Break & Exhibition		Coffee-Break & Poster Session		Scholarship Ceremony & EMEC19 Presentation & Closing Ceremony (Aud. II)	
17:00 – 17:15	OP Env Monit #12 Javier Castro-Jiménez Atmospheric Particle-Bound Organophosphate Esters (OPEs) in a North African Mediterranean Coastal Environment (Bizerte, Tunisia)	OP Env Tech #6 Yael Mishael Efficient Removal of Pharmaceuticlas from Treated Wastewater by Tailored Polycation-Clay Sorbents	Coffee-Break & Poster Session		Scholarship Ceremony & EMEC19 Presentation & Closing Ceremony (Aud. II)	
17:15 – 17:30	OP Env Monit #13 Sofia Augusto Source Apportionment of PAHs in a Petrochemical and Chemical Industrial Area Using Lichens as Biomonitorers	OP Env Tech #7 Yuan Li Removal of the Pharmaceuticals Diclofenac and Trimethoprim from Aqueous Media Using Low-Cost Biosorbents	Coffee-Break & Poster Session		Scholarship Ceremony & EMEC19 Presentation & Closing Ceremony (Aud. II)	
17:30 – 17:45	OP Env Monit #14 Karen Yáñez Concentration Ratios for Polycyclic Aromatic Hydrocarbons from Wood Combustion: Comparison of Laboratory Results and Sampling in Temuco City (Chile)	OP Env Tech #8 Elaine Fabre Agricultural Wastes for Mercury (II) Removal in Wastewater Treatment	Coffee-Break & Poster Session		Scholarship Ceremony & EMEC19 Presentation & Closing Ceremony (Aud. II)	
17:45 – 18:00	OP Env Monit #15 Albert Lebedev Organic Pollutants in Moscow Rain	OP Env Model #9 Ariana Pintor Arsenate and Arsenite Adsorption onto Iron-Coated Cork Granulates	Coffee-Break & Poster Session		Scholarship Ceremony & EMEC19 Presentation & Closing Ceremony (Aud. II)	
18:00 – 18:15	OP Env Monit #16 Mária Mörtl Determination of Surfactants Used in Agrochemicals	OP Env Tech #10 Anna Bogush Potential Utilisation of Air Pollution Control Residue from Municipal Solid Waste Incineration Facility in the Cement Industry	Coffee-Break & Poster Session		Scholarship Ceremony & EMEC19 Presentation & Closing Ceremony (Aud. II)	
18:15 – 19:30	OP Env Monit #17 Dmitry Mazur Organic Pollutants in the Snow of Russian Arctic Islands	OP Env Tech #11 Nuno Cruz Waste Management From Pulp and Paper Industry: Recycling to Soil as a Viable Management Option	Coffee-Break & Poster Session		Scholarship Ceremony & EMEC19 Presentation & Closing Ceremony (Aud. II)	
	Poster Session & Porto D'Honra		Departure for Porto Wine Cellars and Conference Dinner		Scholarship Ceremony & EMEC19 Presentation & Closing Ceremony (Aud. II)	

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Titulo

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Metal Levels in Soil and Plants of Abandoned Gold Mines from Portugal

PP Env Tech #18

L.A.B. Novo^{1,2*}, P. Alvarenga³, P.M.L. Castro², E.F. Silva¹. (1) University of Aveiro, Aveiro, Portugal, (2) Catholic University of Portugal, Porto, Portugal, (3) University of Lisbon, Lisbon, Portugal; *novo@ua.pt



As a consequence of ore exploitation, mining areas often encompass soils that present low cohesion, shortage of nutrients and organic matter, low pH, elevated potential for acid mine drainage generation, and high concentrations of metals [1]. Plants growing on mine sites usually tolerate toxic metal levels through mechanisms that include metal accumulation or exclusion. Hence, these metal-tolerant plants (known as metallophytes) can sometimes be used for biogeochemical prospecting, environmental biomonitoring, and soil reclamation through phytoremediation [2,3]. In this study, nine abandoned gold mines from Portugal were surveyed to determine metal concentrations in their soils and colonizing plants.

Soil and plant samples were collected at the following mines: Grovelas (Ponte da Barca), Marrancos (Vila Verde), Castromil (Paredes), Banjas (Paredes), Santo António (Penedono), Escádia Grande (Góis), Lousal (Grândola), Aljustrel (Aljustrel), and São Domingos (Mértola). Metal contents in soil and plant tissue were assessed by inductively coupled plasma mass spectrometry (ICP-MS).

In soils, the highest concentration ranges (expressed in mg kg⁻¹) for selected metals were found at:

- Aljustrel (6.5<[Ag]<15.62)
- Marrancos (1.16<[Au]<12.75)
- Penedono, (2,725<[As]<10,000)
- Castromil (104.1<[Cr]<157.1)
- Aljustrel (3.03<[Hg]<19.74)
- Aljustrel, (5,463<[Pb]<10,000)

In addition to highlighting the elevated levels of polluting metals, these results may also hint at the possibility of using another plant-based technique known as phytomining [4], to recover valuable metals from these soils (particularly Au).

Among plants, the most noteworthy results were observed on *Polytrichum commune* (common haircap), and two *Agrostis* species, *Agrostis delicatula* and *Agrostis curtisii* (hereinafter referred to as bentgrass plants). Common haircap exhibited shoot Ag concentrations up to 1.15 mg kg⁻¹ at the mine of Castromil, and up to 8.31 mg kg⁻¹ at the mine of Penedono. These findings suggest the aptitude of this species for Ag bioindication given that the concentrations were 1-2 orders of magnitude greater than those measured on every other species from all mines. The bentgrass plants, found solely at the Penedono mine, displayed root and shoot As levels up to 3,129 and 1,227 mg kg⁻¹, respectively. On average, these concentrations were at least 100-fold those registered on the majority of plant species from all mines. Thus, these bentgrass plants constitute promising prospects for biomonitoring soil As, as well as to promote the restoration of As polluted mine lands via phytostabilization.

Additional analysis to the comprehensive array of data obtained in this study (over 40 elements and several physicochemical parameters have been investigated), may provide greater understanding about the selected mines, their environmental risks, future challenges and opportunities.

Acknowledgements

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References

- [1] V. Asensio et al., *Science of the Total Environment*, 443 (2013) 46.
- [2] J. Pratas et al., *Journal of Geochemical Exploration*, 85 (2005) 99.
- [3] L.A.B. Novo et al., *Water, Air, & Soil Pollution*, 224 (2013) 1513.
- [4] L.A.B. Novo et al., *Phytoremediation*, 5, (2017) 469.