List of Sessions

Last update: September 30, 2026

CLAYS & SOCIETY

CLAYS IN BIOMEDICINE

CS01_Clays in biomedicine

Clay minerals and layered double hydroxides (LDHs) have gained significant attention as multifunctional materials for addressing challenges in human health, biomedical sciences, food safety, and quality of life. Their distinctive structural features, ion-exchange capacity, tunable chemistry, chemical stability, and biocompatibility provide versatile platforms for applications including drug delivery, regenerative medicine, food technologies, cosmetics, sustainable agriculture. Clay materials can be structurally tailored at the atomic-molecular scale to enhance drug adsorption and controlled release for biomedical applications. Clay- and LDH-based nanohybrids enable smart systems with tailored functionalities for bioapplications. This session welcomes contributions focused on the synthesis, structural regulation, advanced characterization, modification, functional design, and application of clay materials, LDHs, and hybrids.

Convenors:
Huaming Yang, China University of Geosciences (Wuhan), China, hm.yang@cug.edu.cn
Serena Riela, University of Catania, Italy, serena.riela@unict.it
César Viseras, University of Granada, Spain, cviseras@ugr.es
Christine Taviot-Guého, Institut de Chimie de Clermont Ferrand, France, christine.taviot-gueho@uca.fr
Menghan Yu, China University of Geosciences (Wuhan), China, yumenghan@cug.edu.cn

CLAY BARRIERS IN GEOENVIRONMENTAL APPLICATIONS

CS02_Clays in geoenvironmental and geoenergy applications

Clay and clay-based materials are central to current challenges related to climate change, environmental protection, energy transition and sustainable development. They are used as natural geological formations, such as caprocks for CO_2 and hydrogen storage or barriers for waste disposal, and as engineered materials in embankments, raw earth buildings, landfill liners, covers and containment systems. These applications expose clays to extreme and unusual thermo-chemo-hydro-mechanical actions, including thermal gradients, cyclic loading, evaporation, harsh fluids and contaminated leachates, requiring new experimental and theoretical approaches. The session welcomes experimental and numerical contributions on natural and engineered clays across multiple scales, promoting interdisciplinary studies spanning environmental geochemistry, geotechnical engineering and clay

mineralogy, with a focus on material performance, contaminant attenuation, durability and long-term stability.

Convenors:
Guido Musso, Politecnico di Torino, Italy, guido.musso@polito.it
Mercedes Regadío, Universidad Autónoma de Madrid, Spain, mercedes.regadio@uam.es
Vincenzo Sergio Vespo, Politecnico di Torino, Italy, vincenzosergio.vespo@polito.it
Gabriele Della Vecchia, Politecnico di Milano, Italy, gabriele.dellavecchia@polimi.it
Sahadat Hossain, The University of Texas at Arlington, USA, hossain@uta.edu
Agamuthu Pariatamby, Sunway University, Malaysia, agamutup@sunway.edu.my

SOIL HEALTH:

1. AGRICULTURE AND SOIL HEALTH

CS03_Applications & environment: role of clay minerals in agriculture and soil health

Clay minerals play a key role in soil fertility and sustainable agriculture as they regulate the retention, speciation, transport and bioavailability of essential nutrients. Through interactions between clay, microorganisms and plants, they regulate processes such as sorption and desorption, mineral dissolution, redox transformations and the formation of organo-mineral complexes, which ultimately determine plant nutrition, microbial activity and soil health. Recent advances in material science have expanded the applications of clay through nanostructuring surface modification and engineered materials, enabling the development of controlled-release fertilizers and clay-based systems for the release and immobilisation of beneficial microorganisms, thereby improving nutrient use efficiency and crop resilience. This session will explore fundamental mechanisms and innovative applications that link clay-mediated nutrient dynamics with plant nutrition, rhizosphere processes, soil functioning and ecosystem resilience. Emphasis will be placed on contributions that integrate laboratory, field, analytical and modelling approaches with aim of promoting sustainable solutions for agricultural productivity and soil health.

Convenors:
Araceli Pérez-Sanz, Universidad Autónoma de Madrid, Spain, araceli.perezs@uam.es
Mohamed El-Sayed, Agriculture Research Center, Egypt, mohamed.elsayed@arc.sci.eg
Sandra López-Rayo, Universidad Autónoma de Madrid, Spain, sandra.lopez@uam.es

2. ENVIRONMENTAL CONTAMINATION AND SOILS

CS04_Clays and modified clays in sustainable environmental remediation: mechanisms, design and application

Clay minerals are abundant natural nanomaterials with high surface area and ion-exchange capacity, making them effective for contaminant adsorption and degradation in soil and water systems. Their performance can be enhanced through thermal, chemical, mechanochemical, surfactant, ion-exchange, or pillaring treatments, enabling the development of advanced remediation materials such as nanocomposites and hybrid systems. This session focuses on the mechanisms, design, synthesis, and application of raw and modified clays for environmental remediation. Contributions addressing adsorption, ion exchange, catalytic degradation, contaminant transport, sustainable production, material regeneration, and environmental safety are encouraged. Analytical, experimental, modelling, and field-based studies targeting inorganic, organic, emerging, or mixed contaminants are particularly welcome.

Convenors:

Bhabananda Biswas, Global Centre for Environmental Remediation, The University of Newcastle; crcCARE, Australia, bhaba.biswas@newcastle.edu.au
Jérôme Labille, CEREGE, Aix-Marseille University, France, labille@cerege.fr
Laurence N. Warr, Institute of Geography and Geology, Greifswald University, Germany, warr@uni-greifswald.de

CLAY & GASES

CS05_ Clays and clay-based materials in gas capture, transport, separation, and conversion

Clay minerals and clay-based materials offer versatile platforms for capturing, separating, storing and converting gases, in particular CO_2, H_2, and CH_4. This session addresses gas interactions with natural, modified, and synthetic clay minerals from a materials science and geological perspective: adsorption and intercalation in the interlayer galleries, gas migration, cation-controlled selectivity, gas separation membranes and sorbents, catalytic conversion of CO_2, and clay-based composites and hybrid materials. Contributions are welcome on synthesis and functionalization, on in situ and operando characterization including large-scale facility techniques, on modelling and simulation, and on applications ranging from biogas upgrading and carbon capture to gas barriers, reservoir caprocks and storage. The aim is to bring together the materials, geochemistry, petrophysics, chemistry and physics communities working on natural and engineered clay systems.

Convenors:
Jon Otto Fossum, SCML International AS, Oslo, Norway; PMMH-ESPCI Paris, France; LNNano-CNPEM, Campinas, Brazil, jo@scml.no
Josef Breu, University of Bayreuth, Germany, josef.breu@uni-bayreuth.de
Cliff T. Johnston, Purdue University, West Lafayette, USA, cliffjohnston@purdue.edu
Arkadiusz Derkowski, Polish Academy of Sciences, Kraków, Poland, ndderkow@cyf-kr.edu.pl
Paweł P. Ziemiański, NAGRA, Switzerland, pawel.ziemianski@nagra.ch

CLAYS: TECHNOLOGY & INNOVATION

ADVANCED APPLICATIONS AND CUTTING TECHNOLOGIES: 2D SOLIDS

CT01_Design and applications related to intercalated 2D clays. 1. Advanced synthesis, modification and processing

This session aims to bring together the latest contributions on the bottom-up synthesis, modification, hybridization, and assembly of 2D clay minerals and related two-dimensional nanostructures — including layered double hydroxides (LDHs) and titanates — whose electronic, photo/optical, catalytic, and mechanical properties continue to broaden the scope of clay sciences. Particular emphasis will be devoted to synthetic strategies enabling precise control of composition, structure, morphology, defects, surface chemistry, and interfaces, together with a deeper understanding of the mechanisms governing their formation. Modification and hybridization of layered materials through intercalation, exfoliation, surface functionalization, and heterostructure formation provide versatile routes to tune their structure and physicochemical properties. Understanding the relationships between synthesis, modification, nanoscale structure, and properties will be a central theme, supported by advanced experimental characterizations and computational approaches. All the contributions combining synthesis, characterization, modelling, and assembly are particularly welcome, with a focus on establishing synthesis–structure–assembly–property relationships.

Convenors:
Vanessa Prevot, Institut de Chimie de Clermont-Ferrand, CNRS/UCA, France, vanessa.prevot@uca.fr
Erwan Paineau, Laboratoire de Physique des Solides, CNRS/UPSaclay, France, erwan-nicolas.paineau-lanone@cnrs.fr
Eric H. Hill, Basque Center for Materials, Applications, and Nanostructures, Bilbao, Spain, eric.hill@bcmaterials.net
Gonzalo Abellan, Instituto de Ciencia Molecular (ICMol), University of Valencia, Spain, gonzalo.abellan@uv.es

CT02_ Design and applications related to intercalated 2D clays. 2. State of the art modified clays for current and cutting-edge applications and technologies

For this session, we aim to welcome the scientific community dedicated to the specific design of two-dimensional clay minerals and clay-like materials, whose intercalation properties are crucial for applications in energy, catalysis, polymer composites, the environment, and health. Intercalation reactions can be used to accommodate different guest species for reaching a systematic control and fine tuning of the final properties of the derived compounds, thus allowing them to be used for various applications. This session promises to be lively; the presentations and discussions will broaden our perspective on current challenges regarding these host structures—natural or synthetic, and as fascinating as they are versatile, which are adapted and optimized via appropriate chemical processes to meet specific societal needs. Particular attention will be paid to the latest advances in characterizations, as well as the growing role of artificial intelligence and machine learning.

Convenors:
Chiara Bisio, University of Piemonte Orientale Amedeo Avogadro, Italy, chiara.bisio@uniupo.it
Jocelyne Brendle, Haute Alsace University, Mulhouse, France, jocelyne.brendle@uha.fr
Yongjun Feng, Beijing University of Chemical Technology, China, yjfeng@mail.buct.edu.cn
Fabrice Leroux; Chemical Institute of Clermont-Ferrand (CNRS/UCA), France, fabrice.leroux@uca.fr
Makoto Ogawa, Shinshu University, Japan, waseda.ogawa@gmail.com

FROM FUNDAMENTALS TO ADVANCED APPLICATIONS: 1D CLAYS_APPLICATIONS

CT03_One-dimensional nanostructured clay minerals: bridging natural mineral resources and advanced functional applications

This session focuses on one-dimensional (1D) nanostructured clay minerals and related materials, including their resource characteristics, properties, functionalization, processing, and industrial applications. Contributions on natural fibrous and tubular clays, synthetic analogues and derivatives, and comparisons with 2D or 0D clay materials are welcome. Studies highlighting representative 1D clay resources from different countries or regions are especially encouraged, including mineralogy, processing, secondary resources, and resource potential. The session also welcomes work on surface modification, nanostructure control, scale-up, and high-value applications in energy storage, catalysis, drilling fluids, environmental remediation, agriculture, biomedicine, and sustainable engineering. Participation from academia and industry is encouraged to promote interdisciplinary exchange and collaboration.

Convenors:
Peng Yuan, Guangdong University of Technology, China, yuanpeng@gdut.edu.cn
Pilar Aranda, Materials Science Institute of Madrid (ICMM), CSIC, Spain, pilar.aranda@csic.es
Antoine Thill, CEA Saclay, France, antoine.thill@cea.fr
Giuseppe Lazzara, University of Palermo, Italy, giuseppe.lazzara@unipa.it
Wufei Tang, Hunan Institute of Science and Engineering, China, tangwf@huse.edu.cn
Lala Setti Belaroui, University of Oran1 Ahmed Ben Bella, Algeria, belaroui.lalasetti@univ-oran1.dz

CLAYS AND OTHER POROUS SOLIDS: PREPARATION AND APPLICATIONS

CT04_Valorization and transformation of clays into advanced materials

This session will highlight innovative strategies for the valorization and transformation of clays and waste-derived resources into advanced materials with enhanced properties and high-value applications. Contributions will explore the conversion of abundant and low-cost clays, such as kaolin and other phyllosilicates, into a wide range of functional materials, including zeolites, porous and nanostructured materials, clay composites, metal-organic frameworks (MOFs), and templated carbons. Particular attention will be given to innovative approaches such as hydrothermal synthesis, acid activation, templating, nanosizing, and the use of clays as nanocasts, as well as the incorporation or transformation of waste materials into value-added products. The resulting materials can exhibit tailored porosity, surface reactivity, mechanical properties, and other functionalities suitable for applications in environmental remediation and wastewater treatment, energy, advanced separation processes, and construction. Contributions addressing multifunctional materials, including zeolite–geopolymer composites and other clay-based materials for structural and construction applications, are also encouraged. The session aims to bring together researchers working on different approaches to clay and waste valorization, fostering interactions between innovative synthesis strategies, material development, and emerging applications.

Convenors:
José Manuel Moreno-Maroto, Department of Geology and Geochemistry, Autonomous University of Madrid, Spain, josemanuel.moreno@uam.es
Noelia Cotón Sánchez, Department of Geology and Geochemistry, Autonomous University of Madrid, Spain, noelia.coton@uam.es
Nicholas M. Musyoka, Department of Chemical and Environmental Engineering, University of Nottingham Ningbo, China, nicholas.musyoka@nottingham.edu.cn

Chrispin B. O. Kowenje, Department of Chemistry, Maseno University, Kenya, ckowenje@maseno.ac.ke
Fatima Zohra El Berrichi, Laboratoire de Génie Civil et d'Hydraulique, Université 8 Mai 1945. Guelma, Algeria, zora172001@yahoo.fr
Safia Himri, Laboratoire de Génie Civil et d'Hydraulique, Université 8 Mai 1945. Guelma, Algeria, himri.safia@gmail.com

CLAYS & SUSTAINABILITY: APPLICATIONS

1. GENERAL ASPECTS

CT05_ Clays in and for environmental sustainability: from natural processes to functional materials

Clay minerals are integral to environmental sustainability, both as reactive components of natural and human-impacted environments and as versatile resources for sustainable materials and technologies. This session bridges these two perspectives by exploring clays in the environment and clays for the environment. Particular emphasis is placed on how mineral structure, surface and interfacial processes, transformations, and structure–property–function relationships govern clay behavior in natural and engineered systems. By connecting environmental mineralogy with applied clay science, the session aims to advance fundamental understanding and promote its translation into sustainable environmental functions and applications.

Convenors:
Emmanuel Tertre, Institute of Environmental and Materials Chemistry in Poitiers, CNRS/Poitiers University, France, emmanuel.tertre@univ-poitiers.fr
Guanzheng Zhuang, School of Environmental Science and Engineering, Guangdong University of Technology, China, zhuangguanzheng@gdut.edu.cn
Valentin Robin, Water and Environment Limoges, Limoges University, France, valentin.robin@unilim.fr
Liva Dzene, Institute of Material Science of Mulhouse, University of Upper Alsace, France, liva.dzene@uha.fr
Heather Kaminsky, Northern Alberta Institute of Technology, USA, hkaminsky@nait.ca
Chi Zhang, College of Natural Resources and Environment, Northwest A&F University, China, chizhang@nwafu.edu.cn

2. APPLICATIONS & ENVIRONMENT: WATER REMEDIATION

CT06_Clays, organoclays, and nanocomposites in environmental applications

Clay minerals, organoclays, and clay-based nanocomposites are versatile, cost-effective, and environmentally friendly materials with applications in environmental protection, agriculture, energy, food production, industrial catalysis, and other sectors. Natural clays are abundant, thermally stable, inexpensive, and possess properties that make them useful as adsorbents, catalysts, ion exchangers, binders, thickening agents, and sensor components.

Chemical modification with organic cations and the development of polymer-clay nanocomposites greatly expand their functionality. These materials can be tailored for specific applications, including the removal of emerging contaminants from soil, water, and air, as well as the enhancement of fertilizers and pesticides through controlled release, reduced leaching and evaporation, and improved photostability. Polymer-clay nanocomposites can also provide superior mechanical, thermal, barrier, fire-resistant, and radiation-resistant properties while maintaining optical transparency.

This session focuses on the role of natural and modified clay-based materials in environmental protection and aims to advance understanding of their diverse current and emerging applications.

Convenors:
Giora Rytwo, Tel Hai University, Israel, rytwo@telhai.ac.il
Tanushree Choudhury, VIT Chennai, India, tanushree.c@vit.ac.in
Yael Zvulunov, Faculty of Civil & Environmental Engineering, Technion – Israel Institute of Technology, Israel, yaelzvulunov@gmail.com

3. CERAMIC MATERIALS

CT07_Applications towards the resource-efficient manufacturing of ceramic materials

Clays have been essential to ceramic production for millennia and are key to developing advanced, sustainable and efficient ceramic materials. Clay-based materials offer opportunities for eco-friendly products and efficient manufacturing, while reducing raw material extraction, energy consumption and greenhouse gas emissions.
This session welcomes both traditional and innovative approaches to the development of sustainable clay- and ceramic-based materials, including construction, utility and functional materials. Contributions addressing the relationships between clay mineral characteristics, processing behaviour, microstructure evolution and the technological performance of ceramic products are encouraged. Topics include secondary raw materials and industrial by-products, additive manufacturing, unfired and alternative clay technologies, reduced-temperature processing, and innovative, low-impact products.
The session brings together researchers from mineralogy, geology, ceramic science, materials engineering and industry to discuss advances and future perspectives in the sustainable use of clay resources.

Convenors:
Fernanda Andreola, Università degli Studi di Modena e Reggio Emilia - UNIMORE, Italy, fernandanora.andreola@unimore.it
Ewelina Kłosek-Wawrzyn, AGH University of Krakow, Poland, eklosek@agh.edu.pl
Elena M. Pérez-Monserrat, CICECO - Aveiro Institute of Materials, University of Aveiro, Portugal, elena.pmonserrat@ua.pt
Meriam Elouahabi, University of Liège, Belgium, elouahabi.meriam@saint-luc.be

4. CATALYSIS & ADSORBENTS

CT08_ Application of natural and synthetic layered materials as catalysts and adsorbents

The session will cover a wide range of natural and synthetic cationic and anion layered materials related to adsorption and catalysis applications. Recent research advances in modification of natural and synthetic clays and synthesis of clays that allow to change their functionalities for their application as catalysts and adsorbents are welcome. Modifications include ion exchange, intercalation and surface or interlayer grafting by organic and/or inorganic species. One of the main scopes of this session will encompass rational design of clays and modified clays and their structural and textural characterization. Thus, the session will cover all experimental and theoretical aspects of clay science in the fields of heterogeneous (photo)catalysis (acid-base and redox reactions), environmental protection, medical science, and adsorption processes. The aim of this session is to provide insight into the possibilities of these materials for the development of new processes for environmental protection and green processes with potential industrial applications.

Convenors:
Antonio Gil, Public University of Navarra, Pamplona, Spain, andoni@unavarra.es
Miguel Angel Vicente, University of Salamanca, Salamanca, Spain, mavicente@usal.es

Katia J. Ciuffi, Universidade de Franca, Franca, Brazil, katia.ciuffi@cruzeirodosul.edu.br
Maria N. Timofeeva, Institute of catalysis SB RAS, Russia, timofeeva@catalysis.ru.
Rosembergue G.L. Goncalves, University of São Paulo, São Carlos, Brazil, rosembergue@usp.br
Jairo Tronto, Universidade Federal de Viçosa, Viçosa, Brazil, jairotronto@ufv.br

5. ENERGY

CT09_ Clays & sustainability: applications in energy

This session will explore the broad and emerging role of clay minerals in energy-related applications, encompassing both established technologies and new research directions. Attention will be given to their use in electrochemical energy storage and conversion, including batteries, supercapacitors, and electrocatalysis, as well as in thermal energy storage and management, where their thermal properties, structural versatility, and compatibility with composite systems offer opportunities for sustainable heat-storage technologies. Other emerging applications, including clay-based functional materials, membranes, catalysts, and components for energy-related environmental technologies, will also be considered.
The session aims to bring together researchers working across mineralogy, crystallography, materials science, geochemistry, computational chemistry, and engineering to discuss how the fundamental properties of clay minerals can be translated into innovative energy technologies and sustainable solutions. Fostering this cross-disciplinary dialogue is essential to unlock the full potential of clay minerals in driving both technological innovations in clean energy and sustainable solutions for environmental protection.

Convenors:
Kausik Mukhopadhyay, University of Central Florida, United States, kausik@ucf.edu
Esperanza Pavón, University of Seville, Spain, epavon@us.es
Seth Darling, AMEWS Energy Frontier Research Center, Argonne National Laboratory, Chicago, United States, darling@anl.gov
M. Dolores Alba, ICMSE-CSIC, Spain, alba@icmse.csic.es
Vasily Artemov, Hamburg University of Technology, Germany, vasily.artemov@tuhh.de

6. ENGINEERING

CT10_Clay behaviour, bio-based soil improvement and sustainable geotechnical applications

Clays and clay-rich fine-grained materials play a central role in geotechnical and geoenvironmental engineering. Their properties control key processes such as compaction, mechanical stability and contaminant transport. The behaviour depends on pore-water chemistry and soil fabric, creating opportunities and challenges in applications including foundations, tunnelling, and waste-management systems. They can be modified through additives to achieve specific engineering properties.

Growing interest is focused on biogeotechnical approaches to enhance soil performance while reducing environmental impacts, supporting low-carbon geotechnical practices. Understanding and predicting clay behaviour remains essential for environmental risk assessment and engineering design.

This session addresses clay characterization, property modification, biogeotechnical innovations, testing methods, design and monitoring approaches, standards and decision-support tools.

Convenors:
Michael Plötze, ETH Zurich, Switzerland, ploetzel@ethz.ch
Elena Scibilia, Norwegian University of Science and Technology, Norway, elena.scibilia@ntnu.no

Claudia Vitone, DICATECh, Politecnico di Bari, Italy, claudia.vitone@poliba.it
Wolfgang Lieske, Georesource Engineering, Georg Agricola University of Applied Sciences (THGA), Germany, wolfgang.lieske@thga.de
Oscar Kelly, BYK UK, United Kingdom, oscar.kelly@altana.com

CT11_Clay geomaterials: from micromechanics to engineering

Clay geomaterials derive their distinctive engineering behaviour from multiscale processes spanning from mineral–fluid interactions at the nanoscale and particle association and aggregation at the mesoscale to the evolving pore structure at the continuum scale. This session focuses on the micromechanical mechanisms governing clay behaviour, as well as the macroscopic response under diverse thermo-hydro-mechanical-chemical (THMC) conditions.

Contributions addressing clay micromechanics, such as particle-scale interactions, stacking and aggregation, clay fabric and microstructure, as well as how they evolve under diverse conditions, are welcome. The session encourages molecular- and particle-scale simulations, micromechanically informed modelling, experimental characterization, and multiscale approaches that bridge observations across scales to explain coupled THMC behaviour. The session aims to advance understanding of how clay micromechanics evolution translates into engineering behaviour and provide a basis for improved design of clay geomaterials in geotechnical and geoenvironmental systems.

Convenors:
Himanshu Yadav, Post Doctoral Fellow, Department of Civil Engineering, Indian Institute of Technology Bombay, Mumbai, India, himanshu.yadav@iitb.ac.in
Angela Casarella, Department of Civil and Environmental Engineering, Imperial College London, United Kingdom, a.casarella@imperial.ac.uk
Xiaojin Zheng, School of Civil and Environmental Engineering, Nanyang Technological University, Singapore, xiaojin.zheng@ntu.edu.sg

CLAY BARRIERS FOR RADIOACTIVE WASTE DISPOSAL

Current designs of deep geological repositories for the disposal of radioactive waste rely to a large extent on the key properties of clays. Clay host rocks and engineered barriers exhibit a low hydraulic conductivity, self-sealing ability, swelling capacity, high radionuclide retention properties, and long-term geochemical stability. These properties are at the core of the required long-term containment of radionuclides.

In different geological disposal concepts, clay-based materials fulfil a variety of functions. Bentonite–sand mixtures are a key-component of engineered barriers surrounding waste containers and may also be incorporated into the cores of seals at the entrances to underground structures. By contrast, galleries and other access structures within the repository may be backfilled with mixtures of crushed excavated claystone, used alone or mixed with sand, bentonite, or other treatment products to meet target hydromechanical and transfer properties. These materials play a major role in water, gas and solute transfers while ensuring long-term mechanical stability.

However, the repository system undergoes significant perturbations due to coupled thermal, hydrogeological, mechanical, chemical and biological processes. Initially unsaturated, compacted clay-based materials are subjected to heating, drying and wetting cycles, as well as chemical reactions, leading to complex coupled thermo-hydro-mechanical-chemical-biological (THMCB) transient processes. Clay minerals play a central role in these processes through their swelling capacity, high surface reactivity, high retention properties and low permeability. Moreover, in crystalline fractured host-rocks, bentonite

erosion and the generation of clay colloids, as well as the potential for colloid-facilitated radionuclide transport remain important scientific and engineering challenges.

This session aims to serve as a forum for active researchers to present their latest findings on problems related to behavior of clayey engineered barriers under THMCB conditions in radioactive waste disposal. Works have to be submitted with reference to one of the following three mini-sessions composing the program:

CT12_ Clay barriers for radioactive waste disposal. Part 1. Behavior of clayey engineered barriers under THMC conditions.

This mini-session brings together multidisciplinary research on multi-scale modelling of coupled multiphysics processes in clayey geomaterials and radioactive waste repositories. Topics include geochemical, geotechnical and physicochemical processes, clay mineralogy and surface chemistry, in-situ and laboratory testing, and innovative characterization and modelling techniques, including the use of artificial intelligence. Contributions on THMC behaviour, repository performance, and gas migration are particularly welcome.

Convenors:

Jean Vaunat, Universitat Politècnica de Catalunya (UPC) - International Center for Numerical Methods in Engineering (CIMNE), Spain, jean.vaunat@upc.edu

Andrés Idiart, AMPHOS 21 Consulting S.L., Spain, andres.idiart@amphos21.com

Jean Talandier, Agence nationale pour la gestion des déchets radioactifs (ANDRA), France, jean.talandier@andra.fr

Weimin Ye, Tongji University, China, ye_tju@tongji.edu.cn

CT13_ Clay barriers for radioactive waste disposal. Part 2. Ageing and multi-scale performance of crushed claystone-based materials for repository backfilling.

This mini-session welcomes multi-scale experimental, modelling and data-driven studies linking claystone mineral reactivity, particle-scale degradation, microstructural reorganisation and geochemical evolution to macroscopic performance. Contributions may include laboratory tests, outdoor ageing experiments, imaging, intermediate-scale hydration tests, THMC modelling, in situ observations and approaches supporting formulation and design strategies for claystone-based engineered barriers.

Convenors:

Olivier Cuisinier, Université de Lorraine, France, olivier.cuisinier@univ-lorraine.fr

Marvin Middelhoff, GRS, Germany, Marvin.Middelhoff@grs.de

CT14_ Clay barriers for radioactive waste disposal. Part 3. Long-term evolution of bentonite barriers: erosion, colloids and radionuclide migration.

This mini-session welcomes contributions addressing the mechanisms controlling bentonite erosion, colloid generation and stability, and their implications for repository safety. Experimental and modelling studies are encouraged, including investigations on bentonite erosion, colloid transport, bentonite microstructure and radionuclide–colloid interactions. Contributions from natural analogue studies and underground research laboratory are especially welcome.

Convenors:

Thorsten Schäfer, Friedrich Schiller University Jena, Institute for Geosciences, Applied Geology, Germany, thorsten.schaefer@uni-jena.de

Tiziana Missana, CIEMAT, Department of Environment, Spain, tiziana.missana@ciemat.es

Ursula Alonso, CIEMAT, Department of Environment, Spain, ursula.alonso@ciemat.es

CLAY ACTIVATION AND REACTIVITY

CT15_Advances in alkali activation of clay based materials

Clays and clay-rich materials are increasingly recognized as key precursors for low-carbon alkali-activated binders. Advances have expanded suitable raw materials beyond kaolinite to include illitic and smectitic clays, mudstones, sediments, industrial by-products and other aluminosilicate-rich resources. Despite this progress, major challenges persist in understanding how composition, structural order, thermal treatment and dissolution behavior control reactivity during alkali activation. This session invites contributions on mineralogical, physical, chemical and microstructural aspects of alkali activation, from reaction mechanisms to the design of sustainable binders and functional materials. Topics include clay characterization, calcination, activation processes, gel and zeolite formation, durability and valorization of natural and secondary resources, as well as applications in construction, circular-economy strategies, waste stabilization, environmental remediation and advanced functional materials. The aim is to foster dialogue among researchers to deepen understanding of clay mineralogy, activation processes and material behavior.

Convenors:
Ana Maria Fernández Jiménez, Instituto Ciencias de la Construcción Eduardo Torroja (IETcc-CSIC), Spain, anafj@ietcc.csic.es
Daniela Pinto, Earth and Geoenvironmental Sciences Department, University of Bari, Italy, daniela.pinto@uniba.it
Inés García Lodeiro, Instituto Ciencias de la Construcción Eduardo Torroja (IETcc-CSIC), Spain, iglodeiro@ietcc.csic.es

CT16_Clay /lime interactions: from micro approach to construction applications

Lime has been used since Roman times, yet its interaction with clay materials continues to raise scientific questions and connect diverse research communities. This session explores the mechanisms governing interactions between lime (hydraulic lime, quicklime, or low-carbon lime) and clay minerals in soils and building materials. In soil treatment, lime improves workability, strength, and durability through short-term physicochemical modifications and longer-term pozzolanic reactions. In construction, lime–clay interactions influence the durability and performance of mortars, plasters, and raw-earth materials, with implications for the preservation of historic structures. Lime is also used to assess the pozzolanic reactivity of supplementary cementitious materials such as calcined clays.

We invite contributions from chemists, mineralogists, geochemists, soil scientists, and practitioners addressing macro- and microscale processes, including dissolution, flocculation, precipitation, adsorption, microstructural evolution, rheology, ageing, and modelling of lime–clay systems.

Convenors:
Myriam Duc, Université Gustave Eiffel - Laboratory GERS-SRO (UMR TELLURIS), France, myriam.duc@univ-eiffel.fr
Federica Bertola, Lhoist Business Innovation Center, Belgium, federica.bertola@lhoist.com
Lucile Saussaye, CEREMA-ENDSUM, France, lucile.saussaye@cerema.fr

CT17_Mechanical and mechanochemical activation of clays

Mechanical or mechanochemical activation (MCA) has emerged as a promising method for modifying the structure, surface chemistry, and reactivity of clay minerals without the need for high-temperature or chemical additives. By applying mechanical energy to clay minerals, MCA can generate defect-rich structures, alter crystal arrangement, enhance dissolution behaviour, and create new functionalities. Despite significant recent progress, important scientific and technological challenges remain. Addressing these challenges requires collaboration across disciplines.

This session aims to bring together researchers investigating the fundamental mechanisms and emerging applications of mechanochemically modified clay minerals. Contributions are welcomed on topics including low-carbon cementitious materials, supplementary cementitious materials, alkali-activated binders, environmental remediation, water treatment, adsorption and separation processes, pollutant removal, agricultural applications, nanomaterial synthesis, energy-related applications, and the development of advanced clay-based functional materials.

Convenors:
Ilda Tole, University of Bath, United Kingdom, it509@bath.ac.uk
Susan A. Bernal, University of Bath, United Kingdom, sbl30@bath.ac.uk
Jofre Mañosa Bover, University of Barcelona, Spain, jofremanosa@ub.edu
Josep Maria Chimenos Ribera, University of Barcelona, Spain, chimenos@ub.edu

CLAYS: GEOLOGY & PLANETARY SCIENCE

CLAY MINERALS IN MINING

GP01_Clay minerals in mining: challenges and opportunities

Building on existing understanding of known challenges outlined in the book 'clays in the mineral processing value chain' this session would seek to explore emerging technologies and applications related to the clay minerals which are present in ore deposits. This could include: 1. Circular economy principles and how the clays present in waste might be re-purposed (e.g. metakaolin); 2. Technologies for separation of ultrafine particles which might scale to be industrially relevant; 3. The clay-water nexus - pathways to water removal from tailings which facilitate or eliminate 'brute force', high cost engineering options; 4. Characterisation of clay minerals as components of an ore matrix - what they are, what they do, or both.

Convenors:
Angus Mcfarlane, Rio Tinto Iron Ore, Murdoch University, Australia, angus.j.mcfarlane@gmail.com

CLAY AND CLIMATE

GP02_Climatic significance of clay minerals in sediments

Climate reconstructions may be derived from the interpretation of sedimentary proxies. Clay minerals are the only sedimentary proxy used to derive hydrological conditions, beside pollen. Sedimentary clay minerals can be a powerful climate proxy if they fulfil two requirements. First, clay minerals must be detrital in origin, representing either primary or secondary products. Primary clay minerals are inherited from parental rocks by physical weathering. However, any clay mineral can be reworked into a rock that may then be eroded and weathered in a new cycle. Secondary clay minerals result from chemical weathering processes, mainly hydrolysis, occurring on the rock surface and in soils, formed by progressive transformation of a mineral precursor or by a recombination of ions in a confined environment. Second, clays must not be significantly altered by burial diagenesis. In sediments, the clay mineral variability reflects either variable physical and chemical weathering conditions in the watershed, with a significant link to climatic conditions, or changes in the mineral source, the latter being associated with various transport agents. When different sources are involved, a combination of mineralogical and geochemical proxies allows us to trace the provenance, but they also indirectly provide information on transport pathways and paleocurrents. The session is open to any contribution about the interpretation of clay mineral variability in both terrestrial or marine sedimentary records in terms of climate control at different timescales and/or transport paths.

Convenors:
Nathalie Fagel, University of Liege, Belgium, nathalie.fagel@uliege.be
Elisa Laita Florian, Universidad de Jaén, Spain, elaita@ujaen.es

BENTONITE DEPOSITS & AUTHIGENIC SMECTITES

GP03_Authigenic smectites in volcanic and sedimentary terrains: Insights from bentonite deposits throughout the world

Smectites form as authigenic minerals in sedimentary environments by diagenetic processes, often involving volcaniclastic deposits, in volcanic terrains associated with hydrothermal alteration of pyroclastic rocks and lavas. They are the main constituents of bentonites, which are valuable industrial clays with numerous applications. Both the dioctahedral and trioctahedral smectites display compositional heterogeneity within the nanoscale, contributing to variability of physical and

physicochemical properties of bentonites. The heterogeneity is related to paleoenvironmental conditions during formation and is very useful for industrial and environmental applications, but also for exploration purposes. The session will present the research progress on the genesis of dioctahedral and trioctahedral smectites in different geological environments and will address the following topics:

• Compositional heterogeneity of smectites in various geological environments.
• Detection of possible links between intrinsic properties of smectites and the mode of their formation in different environments.
• Genesis of trioctahedral smectites with emphasis on the Li-bearing varieties, considering the recent energy transition trends.
• Petrography as a tool for understanding formation and diagenetic modifications of smectitic clays.
• Authigenic smectites in sediments and soils.
• Geochemistry (elemental and isotopic) and dating of bentonites.
• The role of composition and texture of smectite on bentonite industrial properties.

Convenors:
Georgios E. Christidis, Technical University of Crete School of Mineral Resources Engineering, Greece, gchristidis@tuc.gr
Manuel Pozo, Department of Geology and Geochemistry, Autonomous University of Madrid, Spain, manuel.pozo@uam.es
Telma Musso, PROBIEN, CONICET-UNCo; Department of Geology and Petroleum, National University of Comahue, Argentina, telma.musso@probien.gob.ar

CLAYS AND MOLECULES INTERACTIONS

GP04_Interactions between clay minerals and organic molecules

Clay minerals display a remarkable multiscale architecture, with chemically active and structurally flexible interlayer nanopores that assemble into aggregates containing micro- and macropores. Organic compounds can enter and interact within these spaces, forming organo-clay complexes that play a fundamental role in the stabilization and preservation of organic matter, with broad implications for environmental sciences.

The stabilization of soil organic matter by clays is central to biogeochemical cycling, microbial habitats, and climate regulation. Similarly, interactions between clay minerals and environmental DNA can enhance its preservation, supporting paleogenomic and paleoenvironmental reconstructions.

This session will explore the formation, evolution, and persistence of organo-clay complexes and their significance for organic matter preservation, microbial ecology and evolution, and environmental change. We welcome contributions from mineralogy, sedimentology, geobiology, biogeochemistry, pedology, and (paleo)ecology to foster interdisciplinary discussion on clay–organic interactions.

Convenors:
Zvonka Gveric, ISTerre, Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, IRD, Univ. Gustave Eiffel, France, zvonka.gveric@univ-grenoble-alpes.fr
Carlota Carbajo, Section for Geogenetics, Globe Institute, University of Copenhagen, Denmark, carlota.carbajo@sund.ku.dk

GP05_ Prebiotic chemistry and the role of clay minerals

Understanding the origin of life requires examining physicochemical events that may have occurred on primitive Earth and in extraterrestrial environments, where organic molecules and early synthesis

pathways could emerge. Researchers study these processes through experimental and theoretical simulations grounded in geologically plausible scenarios. Within such settings, solid surfaces, especially clay minerals, are important because they adsorb and concentrate organic compounds on their surfaces promoting chemical reactions. Clays have been identified on Mars, in meteorites, asteroids, and comets, recording interactions among water, minerals, and organic matter. Their presence makes them valuable indicators of planetary evolution and potentially relevant environments for prebiotic chemistry. This session invites studies on clay-organic interactions in chemical evolution processes.

Topics include adsorption and desorption of prebiotic organics, catalysis by mineral surfaces, effects of thermal and radiation energy, and the protective role of clays in preserving molecules relevant to life's origin.

Convenors:
Alicia Negrón-Mendoza, Universidad Nacional Autónoma de México (UNAM), Mexico, negron@nucleares.unam.mx
Ray Dwijesh, Physical Research Laboratory, India, dwijeshray@gmail.com
Uttam Bhui, Pandit Deendayal Energy University, Gandhinagar, ukbhui@gmail.com
Jorge Cruz-Castañeda, Universidad Nacional Autónoma de México (UNAM), Mexico, jorge.cruz@nucleares.unam.mx
Adriana Meléndez-López, Universidad Nacional Autónoma de México (UNAM), Mexico, adriana.melendez@encit.unam.mx
Claudio Fuentes, Universidad Nacional Autónoma de México (UNAM), Mexico, claudio.fuentes@ciencias.unam.mx

CHARACTERIZATION OF CLAYS IN PLANETARY BODIES

GP06_Identification and mapping of clay minerals from earth to space: spectroscopy, remote sensing and planetary exploration

Clay minerals and other phyllosilicates are key indicators of geological and aqueous processes on Earth and planetary bodies, providing valuable information on the environmental conditions and geochemical histories of their formation. This session aims to explore recent advances in the use of spectroscopy for the characterization and identification of clay minerals through laboratory analyses, field studies, and remote sensing observations of both terrestrial and planetary surfaces. Spectroscopic investigations of clay-bearing materials can provide insights into mineral composition, structural properties, alteration processes, and the environmental conditions under which these minerals formed. On Earth, remote sensing techniques offer the possibility of characterizing the spatial distribution and mineralogical variability of clay minerals across large and often inaccessible areas, complementing laboratory and field-based studies. In planetary exploration, orbital and rover-based spectroscopic observations provide a means of identifying phyllosilicates and constraining their geological and geochemical context on Mars and other planetary bodies. Studies integrating spectroscopy at different scales, from laboratory measurements and terrestrial analogs to airborne, orbital, and rover observations, are particularly encouraged. By bringing together Earth-based and planetary investigations, this session seeks to highlight the potential of spectroscopy as a common tool for understanding clay mineral assemblages, their formation and alteration processes, and their significance for reconstructing the geological history of Earth and other planetary bodies.

Convenors:
Javier Cuadros, Natural History Museum, United Kingdom, j.cuadros@nhm.ac.uk
Mercedes Suárez, Universidad de Salamanca, Spain, msuarez@usal.es

CLAYS: SCIENCE FUNDAMENTALS

FUNDAMENTALS: WATER & CLAYS

SF01_Clay–water Interactions: from molecular mechanisms to engineering applications

Water is the most ubiquitous fluid interacting with clay minerals. Whether as liquid water in saturated or partially saturated porous media, or as water vapour in unsaturated and atmospheric environments, the relationship between clays and water governs phenomena spanning geological, environmental, soil, and engineering systems at scales ranging from the angstrom-level interlayer space to the field scale. This session provides a platform for the experimental, computational, and theoretical advances in understanding clay-water interactions from physicochemical interactions to applied studies, where these interactions control macroscopic behaviour. We welcome the contributions covering but not limited to:

- fundamental and molecular-scale studies (interlayer water structure, dynamics, diffusion, etc)

- clay-vapour interactions (hysteresis, capillary condensation, hygroscopic behaviour, etc)

- clay-water interactions (crystalline and osmotic swelling, swelling pressure, hydro-mechanical modelling, wetting-drying cycles, water transport, conductivity, retention, etc)

- computational approaches (molecular dynamics and Monte Carlo simulations, DFT modelling, etc)

- clay-water aspects in environmental, agricultural, and engineering applications (buffers, geomaterials, soils, industrial materials, etc)

Convenors:

Karolina Rybka, Institute of Geological Sciences, Polish Academy of Sciences, Poland, ndrybka@cyf-kr.edu.pl

Georgios Chryssikos, Theoretical and Physical Chemistry Institute, National Hellenic Research Foundation, Greece, gdchryss@eie.gr

Eric Ferrage, Institut de Chimie des Milieux et Matériaux de Poitiers (IC2MP), Université de Poitiers, France, eric.ferrage@univ-poitiers.fr

FROM FUNDAMENTALS TO ADVANCED APPLICATIONS: 1D CLAYS_FUNDAMENTALS

SF02_One-dimensional nanoclays: characterization, modeling and artificial intelligence

This session focuses on the fundamental science of 1D nanoclays and welcomes contributions addressing their structure, properties and dynamics across multiple length scales. Topics include, but are not limited to:

• Structural and chemical characterization using diffraction, scattering and spectroscopic techniques;

• High-resolution imaging of morphology, defects, interfaces and surface processes using TEM, SEM, AFM and related techniques;

• Surface chemistry, adsorption phenomena, colloidal stability, self-assembly, rheology and transport processes;

• Thermal and thermodynamic investigations, including calorimetry, thermogravimetry and in situ or operando studies;

• Computational approaches ranging from quantum-mechanical calculations and molecular simulations to multiscale modelling;

• Machine learning, artificial intelligence and data-driven methods for image analysis, automated characterization, property prediction, materials informatics and accelerated materials discovery.

Convenors:

Giuseppe Cavallaro, University of Palermo, Italy, giuseppe.cavallaro@unipa.it
Pooria Pasbakhsh, The University of Melbourne, Australia, pooria.pasbakhsh@unimelb.edu.au
Lorenzo Lisuzzo, University of Palermo, Italy, lorenzo.lisuzzo@unipa.it
Mingxian Liu, Jinan University, China, liumx@jnu.edu.cn
Rackel San Nicolas, The University of Melbourne, Australia, rackel.san@unimelb.edu.au
Erwan Paineau Lanone, Université Paris Saclay, CNRS, France, erwan-nicolas.paineau-lanone@cnrs.fr

FUNDAMENTALS: CHARACTERIZATION OF CLAYS

SF03_Clay characterization: methods, challenges, and applications

This session focuses on advances in the characterization of natural and synthetic clay minerals using diffraction, spectroscopy, microscopy, thermal analysis, imaging, and complementary analytical techniques. Contributions on qualitative and quantitative phase analysis, crystallography, mixed-layer and disordered clay minerals, structural refinement, multi-technique workflows, reference databases, data-driven approaches, and emerging analytical methods are welcome. Studies demonstrating how characterization informs geological processes, environmental behavior, industrial applications, and the development of advanced clay-based materials are especially encouraged.

Convenors:
Anja Dosen, International Centre for Diffraction Data, dosen@icdd.com
Tom Blanton, International Centre for Diffraction Data, tblanton@icdd.com

SF04_Geoelectrical, electromagnetic, and surface-chemical characterization of clays

This session invites contributions that advance clay characterization by integrating geo-electrical and electromagnetic approaches across scales. We welcome experimental, theoretical, and numerical studies, from laboratory to field -scale observations that aim to link macroscopic electrical responses to microscopic mechanisms. Emphasis is placed on innovative methods and computational modeling that enhance our ability to interpret geophysical data in terms of clay composition, structure, and reactivity. We encourage work combining electrical and dielectric measurements, as well as considering multi-scale petrophysical modeling. Through this cross-disciplinary dialogue, this session seeks to strengthen the prediction and management of clay behavior in complex subsurface environments. It aims to connect researchers from geochemistry, mineralogy, petrophysics, and computational materials science.

Convenors:
Frank Heberling, KIT, Germany, frank.heberling@kit.edu
Pauline Kessouri, BRGM, France, p.kessouri@brgm.fr
Philippe Leroy, BRGM, France, p.leroy@brgm.fr

MODELLING OF CLAYS

SF05_Multiscale computational modelling and characterization of clay minerals and clay-based systems: from atoms to engineering applications

Clay minerals govern many processes in soil evolution, contaminant and radionuclide transport, carbon sequestration, nuclear waste disposal, catalysis and energy storage, yet their behaviour spans atomic-scale interfaces, pore-scale phenomena and macroscopic engineering response. This session invites work that couple characterisation (spectroscopy, scattering, microscopy, tomography, in situ measurements) with computation (molecular dynamics, Monte Carlo, DFT, reactive force fields, pore-scale and continuum modelling), where each constrains and tests the other. Topics include structure, stability and reactivity,

hydration and ion exchange, swelling, reactive transport of contaminants and organic molecules, clay–organic interfaces, coupled thermo-hydro-chemo-mechanical processes, and clay-based materials for energy and environmental applications. We particularly welcome studies linking atomistic simulation to engineering-scale process models, addressing validation and uncertainty quantification, or using machine learning workflows.

Convenors:
Michael Holmboe, Chemistry department, Umeå University, Sweden, michael.holmboe@umu.se
Anne-Catherine Dieudonné, Technische Universiteit Delft, Netherlands, a.c.dieudonne@tudelft.nl
Mehdi Ghasemi, Department of Chemical Engineering, the University of Manchester, United Kingdom, mehdi.ghasemi@manchester.ac.uk
Valentina Erastova, School of Chemistry, The University of Edinburgh, United Kingdom, valentina.erastova@ed.ac.uk
Rolland Pellenq, CNRS, France, roland.pellenq@cnrs.fr
Virginie Marry, Sorbonne Université, France, virginie.marry@upmc.fr

CLAY COLLOIDS

SF06_Colloidal clays and multicomponent systems: fundamentals, properties, functions, and applications

Clay and clay-related materials exhibit complex hierarchical organizations. Their physicochemical, mechanical, rheological, and transport properties are governed by interactions among mineral particles, water, organic and living matter, polymers and other species including multicomponent and biocolloidal systems. This session brings together researchers studying the natural and clay-related materials such as smectites, layered double hydroxides, layered niobates, and nanotubus. Topics include synthesis, exfoliation, swelling, colloidal stability, interfacial phenomena, rheology, gelation, pore structure evolution, consolidation, mechanical behavior, transport, and structure–property relationships. Emphasis will be placed on how multiscale structural organization gives rise to colloidal liquid crystals, gels, and supracolloidal assemblies. Applications cover catalysis, adsorption, separation, electronics, photonics, energy, environmental technologies, geotechnical engineering, mineral processing, waste management, and agriculture.

Convenors:
Nobuyoshi Miyamoto, Fukuoka Institute of Technology, Japan, miyamoto@fit.ac.jp
Erwan-Nicolas Paineau, CNRS researcher, Laboratoire de Physique des Solides, Université Paris Saclay, France, erwan-nicolas.paineau@universite-paris-saclay.fr
Régis Guégan, Associate Professor, ICMN, CNRS-Université d'Orléans, France, regis.guegan@univ-orleans.fr
Andrii Panko, F. D. Ovcharenko Institute of Biocolloidal Chemistry of NAS of Ukraine, Ukraine, phd.wiz@gmail.com

SPECIAL SESSIONS

SPECIAL SESSION ON CLAY TEACHING

SS01_Teaching Clay Science across disciplines: from fundamental properties to societal applications

This specially curated session will showcase forward-thinking approaches to teaching clay science in a multidisciplinary context. We welcome abstract submissions on innovative teaching methods, meta-analyses, global surveys of clay-related disciplines, and related educational topics. In addition to traditional contributed abstracts, the program features high-quality invited presentations and interactive formats designed to stimulate discussion and deliver practical takeaways. These include an extended keynote lecture on innovative multidisciplinary approaches in clay science education, a special talk exploring AI and digital tools such as virtual labs and machine learning, an industry-academia dialogue panel addressing skills gaps and preparing graduates and Early Career Researchers (ECRs) for societal and industrial needs, open talks and poster contributions sharing teaching experiences, and a tribute honoring the legacies of prominent clay scientists. Overall, this dynamic format fosters lively exchange, highlights best practices, and strengthens connections between academia and industry to advance clay science education worldwide.

Convenors:
Bhabananda Biswas, Global Centre for Environmental Remediation, The University of Newcastle; crcCARE, Australia, bhaba.biswas@newcastle.edu.au
Paul Schroeder, Department of Geology, University of Georgia, United States, schroe@uga.edu
Patricia Patrier, University of Poitiers, France, patricia.patrier@univ-poitiers.fr
Blanca Bauluz, Universidad de Zaragoza, Spain, bauluz@unizar.es
Qingze Chen, Guangzhou Institute of Geochemistry, China, chenqingze@gig.ac.cn
Karolina Rybka, Institute of Geological Sciences, Polish Academy of Sciences, Poland, ndrybka@cyf-kr.edu.pl

SPECIAL SESSION IN HONOUR OF YOSHIAKI FUKUSHIMA

SS02_ Clay-polymer hybrid materials— Celebrating the legacy of Dr. Yoshiaki Fukushima

In Memoriam: Dr. Yoshiaki Fukushima.

This session is also dedicated to the respectful memory of Dr. Yoshiaki Fukushima, whose pioneering work in polymer nanocomposites and material innovation at Toyota profoundly influenced the advancement of sustainable and high-performance automotive materials. Dr. Fukushima's deep insight, scientific rigor, and generous mentorship left a lasting impact on colleagues and collaborators alike. His groundbreaking contributions—particularly in the development of nylon-clay hybrids—will continue to inspire the materials science community for years to come.

The sessions focused on the synthesis, characterization, and application of clay-polymer hybrid materials. It aims to foster interdisciplinary discussions on clay-organic functional materials by bringing together the latest findings from both academia and industry. Topics of interest include, but are not limited to:

- Intercalation chemistry
- Exfoliation mechanisms
- Mechanical and thermal properties of polymer-clay nanocomposites
- Industrial applications of hybrid materials

Convenors:
Tomohiko Okada, Shinshu University, Japan, tomohiko@shinshu-u.ac.jp
Eduardo Ruiz-Hitzky, Materials Science Institute of Madrid, CSIC, Spain, eduardo@icmm.csic.es

Makoto Ogawa, Shinshu University, Japan, ogawa@shinshu-u.ac.jp
Pilar Aranda, Materials Science Institute of Madrid, CSIC, Spain, pilar.aranda@csic.es

SPECIAL SESSION IN HONOUR OF VICTOR ANATOLIEVICH DRITS

SS03_Advances in quantitative characterization of layered compounds - A tribute to Victor Anatolievich Drits

Over the last years, structural characterization of layered compounds has benefited from the development of new techniques, from the intrinsic evolution of commonly used techniques (TEM, XAS, XRD, PDF, FTIR, etc), and especially from improvements in quantitative methods of data analysis.

Notably over the same time, the Reynolds Cup has prompted major improvements of the protocols and methods used for quantitative analysis of clay-containing mixtures. Significant progress also came from the combination of determinative methods allowing for a thorough structural characterization of complex and/or very defective lamellar structures, including natural materials and mixed-layered materials. Integration of experimental and computational approaches has also allowed enhancing further data interpretation. This session will be devoted to the advances of individual techniques, to new possibilities offered by their combination, and to the additional understanding provided by computational approaches. New structural interpretations and insights into the formation and evolution of such materials in natural environments are also relevant. Materials of interest include, but are not limited to, phyllosilicates, layered oxides, layer double hydroxides, and layered compounds in general, along with their admixtures.

Convenors:
Rieko Adriaens, Qmineral bv, Belgium, radriaens@qmineral.com
Arkadiusz Derkowski, Polish Academy of Sciences, Kraków, Poland, ndderkow@cyf-kr.edu.pl
Anne-Claire Gaillot,CNRS, France, Anne-Claire.Gaillot@cnrs-imn.fr
Steve Hillier, The James Hutton Institute, United Kingdom, stephen.hillier@hutton.ac.uk
Bruno Lanson, ISTerre - CNRS / Univ. Grenoble Alpes, France, bruno.lanson@univ-grenoble-alpes.fr
Toshihiro Kogure, The University of Tokyo, Japan, kogure@g.ecc.u-tokyo.ac.jp