



First IRTC conference

Raw materials for a sustainable future

February 15-17, 2023, in Lille, France.

<https://www.irtc-conference.org>

About the Conference

IRTC23 will be all about dialogue on raw materials for a sustainable future. Raw materials play an important role in economic and technological development of, among others, the renewable & digital transition. At the same time, supply of many raw materials heavily depends on precarious and unsustainable supply chains. This conference brings together international leading experts, practitioners and participants, to exchange perspectives and engage in in-depth discussions on how to assess and manage raw materials and criticality, and to explore the potential of different strategies to secure supply. Therefore, IRTC23 welcomes a diverse audience from industry, academics and policy-making concerned with raw materials for a sustainable future.

Keynote Conversations

In a series of keynote conversations, international criticality experts will share their perspectives on critical raw materials for a sustainable future in moderated in-depth discussions.

Talks by Practitioners and Researchers

Practitioners and researchers in the field of critical raw materials are invited to contribute to the shape and content of the conference by sharing their work or case on critical raw materials in relation to thematic sessions as presented in the program below. The sessions will be chaired by multidisciplinary teams of experts to facilitate a discussion with the presenters.

Session Chairs will select the most novel contributions for publication in a special issue of the journal [Mineral Economics](#).

Participants

Participants are invited to join the two-and-a-half-day conference to meet colleagues, keynote speakers and conference Chairs, to engage in discussions in the sessions and to join the networking activities. On-site participation will be limited to around 180 people to encourage meaningful discussions and networking. Online participation in the sessions will be possible.



Wednesday, February 15

10:00	Welcome coffee		
10:30	<p>A. Resource and criticality challenges in diverse lead industrial sectors</p> <p>Part I: Rare Earths</p> <p>Organisers: <i>Nabeel Mancheri (REIA)</i> <i>Naeem Adibi (WeLOOP)</i></p>	<p>B. IRTC-Training workshop</p> <p>Part I: Open stakeholder consultation workshop</p> <p>Organisers: <i>IRTC Education Expert Committee</i></p>	<p>C. UNECE workshop</p> <p>Part I</p> <p>Organisers: <i>Harikrishnan Tulsidas,</i> <i>Charlotte Griffiths</i> <i>Slavko Solar (UNECE)</i></p>
12:00	Conference registration and lunch buffet <i>Pre-workshop refreshment</i>		
13:30	<p>A. Resource and criticality challenges in diverse lead industrial sectors</p> <p>Part II: Battery and data centre equipment (with CEDaCI project)</p>	<p>B. IRTC-Training workshop</p> <p>Part II: IRTC-Business Decision Tool training: Understand raw material risks in the supply chain</p>	<p>C. UNECE workshop</p> <p>Part II</p>
15:30	<i>Coffee Break</i>		
16:00	<p>Open plenary discussion with the Conference Chairs</p> <p>Current geopolitical events and Critical Raw Materials: What to expect from the future, and how can we still collaborate?</p> <p>Darina Blagoeva (JRC, Europe), Claudia Baranzelli (OECD), Gian Andrea Blengini (Politecnico di Torino, Italy), Patrice Christmann (KRYSMINE), Roderick Eggert (Colorado School of Mines), Carolin Friedrich (Stakeholder Consulting), Roland Gauss (EIT RawMaterials), Christoph Helbig (University of Bayreuth, Germany), Paul Lusty (BGS, United Kingdom), Anthony Ku (consultant, USA), Louis Maréchal (OECD), Simon Michaux (GTK, Finland), Luisa Moreno (Tahuti Global, Canada/Uganda) David Peck (TU Delft, Netherlands), Guido Sonnemann (University of Bordeaux, France), Akanksha Tyagi (CEEW, India), Patrick Wäger (Empa, Switzerland), Peng Wang (Chinese Academy of Sciences)</p> <p>– Moderated by Alessandra Hool (IRTC Coordinator) –</p> <p><i>Free access for everyone</i> <i>(click here to join the Zoom meeting)</i></p>		
17:30	Conference registration and welcome reception <i>Check-in, meet & greet</i>		
18:30	Apéro-dinner <i>Snacks, drinks & networking</i>		



Thursday, February 16

08:00	Conference registration	
08:30	Welcome by the conference organizers	
08:45	Introductory remarks by Frédéric Motte (Région Hauts-de-France)	
09:00	Opening speech by Bernd Schäfer (EIT RawMaterials)	
09:15	Keynote conversation: Criticality Roderick Eggert (Colorado School of Mines), Corina Hebestreit (European Carbon and Graphite Association) and Kotaro Shimizu (Mitsubishi UFJ); moderated by Luis Tercero (Fraunhofer ISI)	
10:00	Session 1: Criticality: stakeholder perspectives Chaired by Luisa Moreno (Tahuti Global), Magnus Ericsson (RMG Consulting) and Roland Gauss (EIT RawMaterials)	Session 2: Criticality methods Chaired by Gian Andrea Blengini (Politecnico di Torino) Christoph Helbig (University of Bayreuth) and Philip Nuss (German Federal Environment Agency)
10.00	Paradoxes in material criticality: revealing the multifaceted nature of the phenomenon <i>Yulia Lapko (Politecnico di Milano), David Peck (TU Delft)</i>	Timeline and focus of major criticality studies <i>Michaela Schicho, Luis Tercero (Fraunhofer ISI, Germany)</i>
10.15	Carbon neutral energy transition: 'From Emissions to Resources' <i>Jan Mertens (ENGIE, Ghent University), Fanny Maigne, Olivier Sala, Peter Vervee, Luc Goossens, Elodie Lecadre (ENGIE)</i>	New method and indicators to study mineral criticality from a French Administration's perspective <i>Antoine Boubault (BRGM)</i>
10.30	Niobium as a critical raw material for the world and strategic for Brazil <i>Carlos Peiter, Tiago Braga (Centre for Mineral Technology, Brazil) Gian Andrea Blegnini (Politecnico di Torino)</i>	The IRTC web-tool to support companies in monitoring and mitigating raw material value chain risks <i>Dieuwertje Schrijvers, Alison Vandromme, Sana Almansour, Luigi Poggi (WeLOOP), Alessa Hool (ESM Foundation)</i>
10:45	Discussion with speakers and the audience, led by the Session Chairs	Discussion with speakers and the audience, led by the Session Chairs
11:00	<i>Coffee Break</i>	
11:30	Session 1: Criticality: stakeholder perspectives Chaired by Luisa Moreno, Magnus Ericsson and Roland Gauss	Session 2: Criticality methods Chaired by Gian Andrea Blengini, Christoph Helbig and Philip Nuss
11.30	Ukraine, Russia, Belarus and global mineral supply <i>Magnus Ericson, Olof Löf (RMG Consulting)</i>	Incorporating conflict risk of minerals and metals supply into life cycle assessment <i>Anish Koyamparambath (University of Bordeaux), Steven Young (University of Waterloo), Guido Sonnemann (University of Bordeaux)</i>

11.45	Geography of control? A deep dive assessment on criticality and critical materials supply chains <i>Alberto Prina Cerai (independent analyst)</i>	The Risks of 'Recycling' Recycling Indicators: A Case Study of Tin <i>Jessie Bradley, Benjamin Sprecher (TU Delft), Rene Kleijn (Leiden University), Willem Auping (TU Delft)</i>
12.00	Reducing demand for raw materials with car sharing & other (shared) mobility solutions and policies <i>Dani Sprecher (MyWheels)</i>	Metal criticality assessment of sodium ion batteries <i>Shan Zhang, Swedish University of Agricultural Sciences</i>
12.15	Discussion with speakers and the audience, led by the Session Chairs	Discussion with speakers and the audience, led by the Session Chairs
12:30	Highlight lecture by Pierre Heeroma, LKAB The Rare Earth discovery in Kiruna and its impact on European supply security	
12:50	Lunch + poster session <i>Standing lunch, networking & poster exhibition</i>	
14:00	Keynote conversation: Supplying critical raw materials Karen Hanghøj (BGS), Gavin Mudd (RMIT) and Anders Sand (Boliden); moderated by Dieuwertje Schrijvers (WeLOOP)	
14:45	Session 3: Sourcing and trade Chaired by Paul Lusty (BGS), Nedal Nassar (USGS) and Carlos Peiter (Centre for Mineral Technology, Brazil)	Session 4: ESG and regulation Chaired by Carolin Friedrich (Stakeholder Reporting), Louis Maréchal (OECD), and René Kleijn (Leiden University)
14.45	Examining three decades of global dysprosium supply chain through a material flow analysis <i>Disna Eheliyagoda (Aarhus University & Grundfos), Badrinath Veluri (Grundfos), Devarajan Ramanujan (Aarhus University), Gang Liu (University of Southern Denmark)</i>	Global mineral resource governance for sustainable development <i>Paul Ekins (University College London, UNEP Resource Panel), Patrice Christmann (Krysmine)</i>
15.00	Nickel supply: primary metallurgical processing capacity does not satisfy changing demand <i>Jamie Faubert, Steven Young (University of Waterloo)</i>	Elements and Social Risk Assessment <i>Tatiana Vakhitova (ANSYS)</i>
15.15	The revival of the RE French industry <i>Alain Rollat (Carester, France)</i>	Applicability of Country Governance Indicators for Assessing Environmental and Social Criticality <i>Konstantin Kühnel (BGR), Philipp Schütte (BGR), Vanessa Bach (TU Berlin), Gudrun Franken (BGR), Matthias Finkbeiner (TU Berlin)</i>
15.30	Discussion with speakers and the audience, led by the Session Chairs	Discussion with speakers and the audience, led by the Session Chairs
15:45	Coffee Break	
16:15	Session 3: Sourcing and trade	Session 4: ESG and regulation

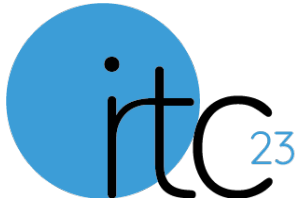
	Chaired by Paul Lusty, Nedal Nassar and Carlos Peiter	Chaired by Carolin Friedrich, Louis Maréchal and René Kleijn
16:15	<p>Natural and synthetic graphite: Trade-offs between carbon footprint and supply risk</p> <p><i>Aina Mas Fons, Anish Koyamparambath, Guido Sonnemann, Philippe Loubet (University of Bordeaux)</i></p>	<p>Digital Product Passport: precondition for sustainable global supply chains</p> <p><i>Elmer Rietveld (TNO; Netherlands)</i></p>
16.30	<p>Tracking the flows of rare earth elements (REEs) in permanent magnets for electric vehicles and wind turbines in the UK to inform circular economy decisions</p> <p><i>Wan-Ting Hsu, Evi Petavratzi, Eimear Deady, Narendra Singh (BGS), Markus Zils (University of Exeter)</i></p>	<p>Rethinking State Sovereignty over the Raw Materials in the era of planetary boundaries</p> <p><i>Daria Boklan (National Research University Higher School of Economics, Moscow, Russia), Chamu Kuppuswamy (University of Hertfordshire)</i></p>
16.45	<p>Developing bottom-up understanding of primary copper supply under the shared socio-economic pathways</p> <p><i>Stephen Northey, Damien Giurco (University of Technology Sydney, Australia), Mohan Yellishetty (Monash University, Australia), Stefan Pauliuk (University of Freiburg, Germany)</i></p>	<p>LIB recycling: A limited yet inevitable solution to cope with the impacts of criticality</p> <p><i>Kim Luu, Naeem Adibi (WeLOOP, France)</i></p>
17.00	Discussion with speakers and the audience, led by the Session Chairs	Discussion with speakers and the audience, led by the Session Chairs
17:15	Poster session	
18:30	<p>Dinner</p> <p><i>Common conference dinner</i></p> <p>OMNIA</p> <p>9 rue Esquermoise - 4 rue du pas - 59 800 Lille</p> <p>https://omnia-lille.com</p>	



Friday, February 17

08:00	Conference registration	
08:30	Welcome and recap of day 1	
08.45	Introductory remarks by Constanze Veeh (DG GROW)	
09:00	Industry intervention by Xavier Constant (Nyrstar)	
09:15	Keynote conversation: Changing demand and how to address it Tom Graedel (Yale University), Toru Muta (IEA) and Paul Ekins (UCL) moderated by Alessa Hool (ESM Foundation)	
10:00	Session 5: Changing demand Chaired by Akanksha Tyagi (CEEW India), Patrick Wäger (Empa) and Darina Blagoeva (JRC)	Session 6: Circularity Chaired by Tatiana Vakhitova (ANSYS), Komal Habib (University of Waterloo), and David Peck (TU Delft)
10:00	Critical materials demand for electrolysers and supply chain dependencies for the EU <i>Darina Blagoeva, Samuel Carrara (Joint Research Center, European Commission)</i>	Design and Circularity of Data Centre Equipment <i>Deborah Andrews, Kristina Kerwin (London South Bank University)</i>
10:15	Exploring different electric vehicle and battery scenarios on critical raw material demand in the UK <i>Sophie Kempston (University of Warwick)</i>	Circular economy systems for lithium-ion batteries <i>Nina Meyer (University of St. Gallen, Switzerland)</i>
10:30	An operational actions strategy for global real change, the International Resource Transition Strategy <i>Harald Sverdrup (Inland Norway University of Applied Sciences), Wouter van Dieren, Marcel Vester (Inis Vitrin, IJpendam, The Netherlands)</i>	Recycling of rare earth elements from electric motors of the e-mobility <i>Gianluca Torta, Fabrizio Passarini (University of Bologna, Italy)</i>
10:45	Discussion with speakers and the audience, led by the Session Chairs	Discussion with speakers and the audience, led by the Session Chairs
11:00	Coffee Break	
11:30	Session 5: Changing demand Chaired by Akanksha Tyagi, Patrick Wäger and Darina Blagoeva	Session 6: Circularity Chaired by Tatiana Vakhitova, Komal Habib, and David Peck
11:30	Insights from three historical critical metal cases: Learning for the future <i>Sampriti Mahanty, Frank Boons, Gavin D.J. Harper (University of Manchester, NICER circular economy centre for technology metals)</i>	Addressing criticality in rare earths through the decarbonization in permanent magnets recycling <i>Denis Prodius, Ikenna C. Nlebedim (Critical Materials Institute, Ames Laboratory)</i>
11.45	Material scarcity and the energy transition: an integrated LCA – IAM perspective	Circular PV Modules <i>Perine Fleury, Tim Kaasjager (Biosphere Solar)</i>

	<i>Christian Bauer, Romain Sacchi, Alvaro Hahn (Paul Scherrer Institute)</i>	
12:00	A low carbon hydrogen economy in the UK: decarbonisation drives long-term PGM demand growth <i>Francesca Price (BGS)</i>	Circularity index for product design: a case study of car-based mobility <i>Gabriel Carmona (University of Cambridge), Kai Whiting (Université catholique de Louvain), Jonathan Cullen (University of Cambridge)</i>
12:15	Discussion with speakers and the audience, led by the Session Chairs	Discussion with speakers and the audience, led by the Session Chairs
12:30	Lunch & poster prize <i>Standing lunch, networking & announcement of poster award</i>	
14:00	Keynote conversation: Addressing criticality in policy and industry Anthony Ku (consultant), Patrick D'Hugues (BRGM) and Min-Ha Lee (KITECH); moderated by Nabeel Mancheri (REIA)	
14:45	Session 7: Industry case studies Chaired by Gwendolyn Bailey (Umicore), Naeem Adibi (WeLOOP) and Orlando Rios (University of Tennessee)	Session 8: Policy case studies Chaired by Peng Wang (Chinese Academy of Sciences), Evi Petavratzi (BGS) and Guido Sonnemann (University of Bordeaux)
14:45	Repurposing and recycling of lithium-ion batteries: Identifying favorable use cases. <i>Surinder Singh, Ratnesh Sharma (Relyion Energy Inc), Anthony Ku (Foresight Transitions Ltd)</i>	Criticality assessment, circularity, EU open strategic autonomy and Sustainable Product Initiative: how to join the dots? <i>Umberto Eynard, Thibaut Maury-Micolier, Fabrice Mathieux, Fulvio Ardente (JRC)</i>
15:00	Critical Minerals Strategy and the Circular Economy for Technology Metals <i>Frances Wall, Carol Pettit (Univ of Exeter)</i>	How worldwide coordinated research funding answers raw materials challenges: a case study <i>Dina Carrilho (Foundation for Science and Technology (FCT), Portugal)</i>
15:15	MagREEsources: the green Rare Earth Magnet company <i>Sophie Rivoirard, Erick Petit (MagREEsources)</i>	OFREMI, the French Observatory on mineral resources for Industrial sector, a public/private partnership <i>Stéphane Bourg, Christophe Poinssot, Patrick D'Hugues (OFREMI)</i>
15:30	Discussion with speakers and the audience, led by the Session Chairs	Discussion with speakers and the audience, led by the Session Chairs
15:45	Coffee Break	
16:15	Summary of the sessions	
16:45	Closing	
17:00	Farewell Apéritif <i>Drinks & goodbyes</i>	



Session descriptions

Session 1: Criticality: stakeholder perspectives

Criticality means something different to a local government than to a multinational company, to a company that controls raw material sources than to a company that relies on supply by others, to a nation endowed with large and varied geological deposits than to one without such an endowment. This session explores different perspectives on criticality that arise from the position of the focal actors.

Session 2: Criticality methods

This session features existing and emerging methods for criticality determination. It explores the usefulness of indicators and the applicability of methodologies to different contexts.

Session 3: Sourcing and trade

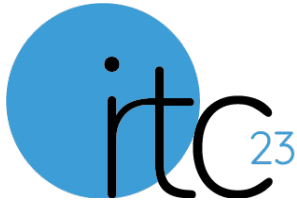
This session explores the distribution of primary and secondary supply, its concentration and issues arising from concentrated supply. Furthermore, trade, trade restrictions and geopolitical issues are tied to global raw material sourcing and key considerations in this session.

Session 4: ESG and regulation

There is an obligation and increased societal and political pressure to better address environmental, social and governance (ESG) issues along value chains. Negative ESG impacts across materials' value chains can make them more critical – by increasing supply risks, or as a separate dimension of concern. This session explores ESG issues related to critical raw materials, including but not limited to reputational risks for companies, risk mitigation measures, regulatory measures, and the state and effectiveness of transparency initiatives.

Session 5: Changing demand

Technological change is a key driver for changing raw material demand, with megatrends such as electric mobility, digitalization and the energy transition expected to drive demand for critical raw materials in the coming decades. This session focuses on scenarios and the (possible) measures by companies and governments to meet this challenge in a responsible and timely manner, as well as competition for the available raw materials, not only between countries or companies in the emerging uses, but also between these and the current users of the critical raw materials.



Session 6: Circularity

Product designers play a key role in determining the current use of raw materials, the longevity of products and the future availability of secondary raw materials. This session highlights current challenges in design as they pertain to the reduced use or substitution of critical raw materials, conflicts between different design dimensions, and best practice examples for reconciling product function and reduced criticality at all scales (company to global) through design for recycling, reuse, remanufacturing, repair, and reduction.

Session 7: Addressing criticality: Industry case studies

This session features case studies from industries dealing with criticality: by risk screening, substitution efforts, fostering recycling, increasing transparency, transitioning to business models to improve resource sustainment, and/or other mitigation measures to reduce risks throughout the supply chain.

Session 8: Addressing criticality: Policy case studies

Policy plays a decisive role in incentivizing and supporting supply risk screening and management. How can they help to effectively mitigate risks for vulnerable industries? In this session, we expect international examples and experiences with policies that aim at favorable framework conditions for risk mitigation and resource conservation.

Register at <https://www.irtc-conference.org>