CRITICAL METALS

PROGRESS OR BURDEN?

Technologisch Gezelschap
Sinds 1890

Welcome

We are pleased to welcome you to this symposium, which is focused on one of the most pressing and complex questions of the energy transition: are critical metals a driver of progress, or an increasing burden on the world? As renewable energy technologies and energy storage solutions continue to expand, society is becoming ever more dependent on materials such as lithium, cobalt and other strategic metals.

These critical metals represent a double-edged sword. They are indispensable for modern technologies, yet their extraction, processing, and geopolitical implications raise serious environmental, ethical and economic concerns

For this reason, this symposium is organized around the central question:

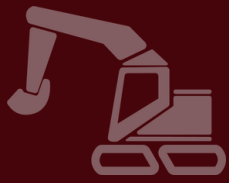
“Are critical metals a sign of progress, or a burden to the world?”

The symposium will be chaired by Pieter-Jan Hagens, who will guide the discussions and ensure a balanced and engaging exchange of ideas throughout the day. We are honoured to welcome a distinguished group of speakers and representatives from different universities and companies.

We warmly invite you to take part a thought-provoking discussion on a topic that will play a crucial role in shaping the future of energy and sustainability.

The 27th Symposium Committee

Programme



10.00: Opening
10.20: Lecture Dr. Theresa Wallner
11.15: Lecture Koos Dirksen
11.55: Lecture Climax Molybdenum
13.20: Lecture Prof. Dr. Slootweg
14.20: Lecture Umicore
15.00: Lecture Haskoning DHV
15.45: Paneldiscussion
16.30: Closure
17.00: Drinks

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Chairman

We are pleased to welcome Pieter Jan Hagens as the Chairman of the Day for this year's symposium. Pieter Jan Hagens is a renowned Dutch journalist and television presenter, known for his clear, thoughtful communication style and his ability to guide complex conversations with depth and nuance. Over the past decades, he has become a familiar face through programs such as Buitenhof, EenVandaag and several other Dutch TV programmes.

Hagens' work frequently explores the intersection of politics, economics, and global affairs just like the theme of this symposium. His experience in moderating these high-level conversations makes him exceptionally well-suited to guide today's symposium and panel discussion.

As we explore whether critical metals represent progress or burden, Pieter Jan Hagens will help navigate the diverse perspectives of our speakers and participants, ensuring an open, sharp and engaging exchange of ideas. We are honored to have him lead us through a day that promises insight, reflection and meaningful debate.

Speakers

We are pleased to welcome Professor Chris Slootweg as one of the academic speakers at this symposium on critical metals. Professor Slootweg is a leading figure in sustainable and inorganic chemistry and currently holds a chair at the University of Amsterdam. His work addresses one of the central challenges of the energy transition: how to responsibly use, replace and recover critical raw materials that underpin modern technologies.

As global demand for technologies such as batteries, catalysts, and renewable energy systems continues to grow, so does our dependence on a limited number of scarce elements. Professor Slootweg's research focuses on understanding and redesigning the chemical role of these critical metals, with particular attention to circular chemistry. His work highlights how fundamental chemical design choices directly influence material scarcity, supply security and environmental impact.

With his presentation Smarter Materials: Green, Circular and Safe by Design, Professor Chris Slootweg will show how we can design circular economies and change our thinking on these topics.

Speakers

As President of Eurosupport, Koos Dirksen faces daily challenges related to critical metals, which are essential components in the catalytic processes that Eurosupport develops and designs. These metals not only determine the efficiency and effectiveness of catalysts but also play a pivotal role in the company's broader technological innovations. One of the key aspects that Eurosupport focuses on is the recyclability of critical metals within these catalysts, ensuring that valuable resources can be recovered and reused rather than lost to waste.

In his talk, Koos Dirksen will delve into the feasibility and practicality of recycling processes for critical metals, highlighting both the technological possibilities and the current limitations. He will explore the entire value chain of critical metals, from sourcing and incorporation into catalysts to recovery and reintegration into new products. By providing a holistic view of this chain, Dirksen aims to illustrate not only the technical challenges involved but also the environmental, economic and strategic significance of improving recycling practices. Attendees will gain insights into how innovation in recycling technologies can contribute to sustainable resource management and reduce dependence on primary extraction, ultimately shaping the future of critical metal use in high-tech applications.

Speakers

As a process engineer at Climax Molybdenum, Wout Lohle works daily at the heart of the challenges surrounding critical metals and their limited global supply. Molybdenum is an essential material in a wide range of applications, playing a crucial role in both the catalyst and battery industries, as well as in high-performance alloys and energy technologies.

In his talk, Wout Lohle will explore the rapidly increasing global demand for molybdenum and the pressures this places on current supply chains. He will discuss potential strategies to meet this demand, including efficiency improvements and smarter material use.
The presentation will also offer fresh insights into where molybdenum is used today, highlighting both well-known and emerging applications. In addition, Wout will take the audience to the very start of the value chain by explaining how molybdenum mining operations work, the technical challenges involved, and how sustainability considerations are increasingly shaping extraction and processing practices.

Climax Molybdenum
A Freeport-McMoRan Company

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Speakers

Dr. Theresa Wallner is Senior Policy Officer at the Ministry of Infrastructure and Water Management and serves as the Dutch coordinator for the Critical Raw Materials Act (CRMA). In this role, she is deeply involved in addressing the growing challenges the Netherlands faces as its dependence on critical materials increases while global supply chains face pressure and uncertainty. She works daily on addressing the challenges the Netherlands faces as its dependence on critical materials grows while supply decreases.

With a PhD in Industrial Engineering from TU Delft, Dr. Wallner brings a unique perspective that bridges technical understanding with policy-making. Her expertise allows her to analyze complex supply chain issues, assess technological dependencies, and contribute to sustainable and strategic solutions. In her talk, she will provide an overview of the Netherlands' current plans and strategies for implementing the CRMA guidelines, highlighting both technical considerations and policy-driven approaches to securing critical raw materials for the country's economy and industry.

Speakers

We are pleased to welcome Bart Verrecht, Senior Program Manager Battery Recycling at Umicore, as one of our distinguished speakers. As the global demand for batteries continues to surge, recycling has become an essential pillar in ensuring a sustainable and circular economy, and will become crucial in strengthening Europe's independence in critical raw materials. At the same time, the battery recycling market and technologies are evolving, with significant shifts in investment strategies and regulatory developments shaping the industry's trajectory.

With upcoming EU regulations, businesses must stay ahead of compliance requirements while adopting the latest advancements in recycling processes. Bart's presentation will focus on Umicore's perspective on these developments, examining the latest regulatory updates and their impact on the industry. It will also assess several battery recycling flowsheets and provide an industrial perspective on efficiency, cost and sustainability.

umicore

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Speakers

We are pleased to welcome Mirjam van der Velde as the final speaker of the day. Mirjam is a Sustainability and Environmental Consultant at Haskoning, where she works at the interface of industry, policy and environmental impact assessment. She brings extensive experience from her career across multiple organizations, with a strong focus on sustainability strategies and the life cycles of materials, including batteries and other critical-material-intensive technologies.

As the global deployment of batteries accelerates renewable energy integration, and the growing demand for energy storage, the sustainability of their entire value chain has become an increasingly urgent issue. From raw material extraction and processing to manufacturing, use and end-of-life management, batteries are embedded in complex and interdependent material chains that rely heavily on critical metals.

In her talk, Mirjam will explore these value chains in detail, examining how they can be made more circular and resilient. She will address key questions surrounding the closing of material loops, the reduction of environmental impacts, and the safeguarding of supply security for critical metals. Particular attention will be given to the roles that both industry and government can play in shaping effective policies, fostering responsible business practices and enabling collaboration across the value chain, making her the perfect closing speaker.

Haskoning
Enhancing Society Together

Panel

We are proud to present the final part of our programme before closure: the panel discussion. In this engaging discussion, we will try to tackle the present and future states of critical metals under the Critical Raw Materials Act (CRMA) in Europe. The act was drawn up to present a guideline for the future in terms of procurement and use of the materials. The panel will take on thought-provoking questions which look to determine if the guidelines in the act are well constructed, and how that will influence the near future.

On the panel will be speakers Prof. Dr. Chris Slootweg, Dr. Theresa Wallner and Wout Lohle to offer their insights on the state of critical raw materials act from their respective fields. In addition, they will be joined by David Sturmes from the Fair Cobalt Alliance who are an international organisation which aims to improve the ecosystem surrounding the mining of cobalt. Furthermore, Michel Don Michaliákos from GeopolitiekNu will also join the panel to give his insights into the geopolitical sphere which surround these materials.

Led by our chairman, Pieter Jan Hagens, we aim to provoke discussion between the panel members to provide a balanced and well-thought-out view of the Critical Raw Materials Act. The goal is to balance the legislation of the critical metals discussed throughout the day against the necessary use.

Companies

QphoX was established in 2021 with the mission to bring innovative networking solutions to tackle the most challenging scaling problems facing quantum computing. Now a diverse team of scientists, engineers and technology enthusiasts, they are united by the belief that creative solutions are required at every stage of technology development.

IChemE

Founded in 1922, the Institution of Chemical Engineers (IChemE) is the UK based and internationally recognised qualifying body and learned society for chemical, biochemical and process engineers.

Welcome to the TU Delft for Life portal, your global online community connecting TU Delft students and alumni from around the world. Reconnect with fellow students and alumni, grow your professional network, and stay informed with the latest news from your alma mater.

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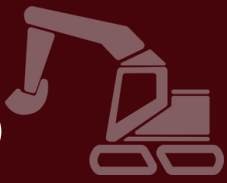

KNCV

The Royal Netherlands Chemical Society (KNCV) is the leading network of chemists, life scientists, and process technologists in the Netherlands. For more than 100 years, they have been connecting chemists, life scientists, and process technologists in the Netherlands.

They believe that chemistry is the key to a sustainable, healthy, and innovative future. Therefore, they bring people and disciplines together, stimulate personal and professional growth, and ensure that ideas lead to impact more quickly.

Chemistry plays a key role in addressing the major societal challenges of today and tomorrow. By encouraging knowledge sharing, collaboration, and professional and personal development, they increase the innovative capacity and impact of chemists. In this way, they ensure that chemists, life scientists, and process technologists — from student to professional — can continue to make a difference in science, industry, and society.

Closure

From the committee, we would like to thank you for attending this symposium. After working hard for a year and a half we were delighted that you took the time to join us to discuss the role critical metals play in our society, now and in the future.

We hope you found each of the lectures interesting and had the opportunity to explore the topic's today in full. Perhaps the day inspired you to continue eexploring what critical metals can bring us, or you used the opportunity to connect with various branches of industry which were represented, in which case we are proud to have been able to provide these opportunities. Nonetheless, we thoroughly enjoyed sharing this day with you and hope you feel the same!
The 27th Symposium Committee

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