

New Academic Staff



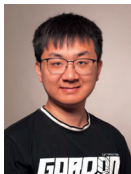
Zeynep Ege Uysal, M.Sc.

Master's degree in Metallurgical and Materials Engineering from September 2022 to August 2025. Since July 2026, she has been working as a research associate in the field of titanium recycling.



Ajithkumar Selvan, M.Sc.

Master's degree in Materials Engineering from October 2022 to September 2025. Since April 2026, He is working as a scientific assistant in the Pure Metals Group under "Circular Steel" project.



Cai Zheyu, M.Sc.

Master's degree in Materials Science and Engineering from Shanghai University. Since May 2026, doctoral researcher at the IME. His current research focuses on the reduction behavior of nickel-bearing resources.



Philip Donhauser, M.Sc.

Master's degree in Industrial Engineering, Major in Materials and Process Engineering from April 2023 to April 2026. Research Associate at the IME in the field of pyrometallurgy since July 2026.

Departures of academic staff:

Dr.-Ing. Alexander Birich, Zixi Gao

New Techn./Admin. Staff:

Max Aurel Eimer is hired as a chemical laboratory technician after passing his exam. Simon Stanetzky is hired as a process technologist after passing his exam.

Departures of Techn./Admin. Staff:

Friedrich Rosen

The newly developed chart on the right now makes it possible to see the trends in the individual MuW degree programs



IME Metallurgische Prozesstechnik und Metallrecycling
Institut und Lehrstuhl der RWTH Aachen University
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Richard Rosner: Verbesserung der Thiourealaugung von Gold aus Elektro- und Elektronikaltgeräten mittels Surfactants

Darjan Huncek-Pita: Thermal decomposition of ammonium metallic fluoride using ultrasonic spray pyrolysis

Cansu Kilic: Entwicklung eines Recyclingkonzepts für HDD-Festplatten mit Schwerpunkt auf der Rückgewinnung von Platingruppenmetallen

Philipp Donhauser: Entwicklung eines Versuchssystems zur Untersuchung des Reduktionsverhaltens von EAF Schlacken im Labormaßstab

Hsing-Jung Peng: Investigation of Fluorine Behaviour and its Influence on Lithium Recovery during Pyrolysis of LIB Black Mass

Maya Andary: Matrixbasierte Untersuchung des Einflusses von Begleitmetallen auf die Löslichkeit von Gallium aus synthetischen Galliumarsenid-ICs

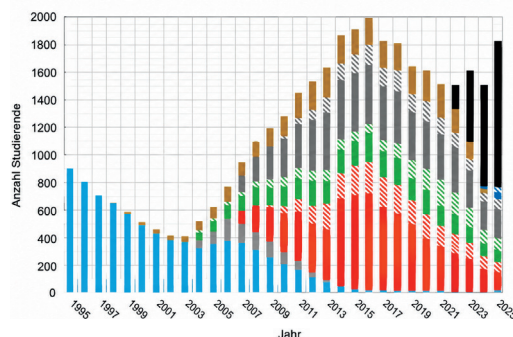
Rabia Özel: Experimentelle Analyse der Mikrowellenpyrolyse von PV-Modulen und Bewertung der Rückgewinnungspotenziale

Dennis Serdukov: Entwicklung und Bewertung von Schlacken für das Elektroschlackeumschmelzen von Kupfer

Naveen Kangapuram Palanisamy: Deoxidative Treatment of a Spent TiMn2 Hydrogen Storage Alloy using a Vacuum Arc Melter

Varshini Ravuthanahalli Jayaramaiah: Investigation of the Decomposition kinetics and reaction mechanism of NMC, LFP and mixed Battery black mass in the presence of additive

Student Statistics



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DIE METALLURGEN

aktuell

IME Metallurgische Prozesstechnik und Metallrecycling
Institut und Lehrstuhl der RWTH Aachen University
Prof. Dr.-Ing. Dr. h.c. Dr. E.h. B. Friedrich

What's new?

Dear friends, members and alumni of IME,
After 25 years of publishing in German, this is our first newsletter in English. As reported, two chairs have been allocated to our institute in the future. We are very happy, that Prof. Elif Emil-Kaya is already very active, while Prof. Isnaldi Souza is expected to start by January next year (detailed report next issue). So we will experience a smooth transition in the governance of the IME, expanding our focus in process metallurgy from light and rare metals to iron-based and other heavy metals. Hydrometallurgy and pyrolysis are here to stay, hydrogen metallurgy is coming, and pyrometallurgy is on the rise. Let's work together to make this concept a reality and build a powerful lighthouse for the future. However, this development also brings personnel changes: alongside my upcoming retirement in February 2027, our Chief Engineer, Dr. Alexander Birich, has already left to start a new chapter at AURUBIS in Hamburg. I am therefore very pleased that we were able to bring Richard Schneider on board two years ago as our second chief engineer, who now handles the many organizational matters with great care.

Bernd Friedrich

20 Years of Cooperation: Serbia Review Workshop

On June 5, 2026, at the Institute of Chemistry, Technology and Metallurgy in Belgrade, a workshop titled "25 years of work of Professor Bernd Friedrich with Serbian Colleagues", was held with participation of more than 30 colleagues from the University of Belgrade, the University of East Sarajevo and colleagues from Serbian Industry. In previous 25 years organized by Dr. Stopic the following results were achieved: 2 AvH Research Fellowships, 51 Research visits, 3 European projects, 3 Doctoral Theses, 20 Publications and 10 DAAD Projects of bilateral cooperation were realized during this period.

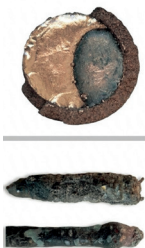
On this occasion, Prof. Friedrich received a certificate of appreciation from the president of the Association of Serbian Metallurgists, Dr. Miroslav Sokic, for his exceptional work and the contribution of metallurgy in Serbia. Filip Kostic from MDPI, who presented the work of the Prof. Friedrich as chief editor of Section for Extractive Metallurgy, emphasized the results in

the field of pyrometallurgy, hydrometallurgy, metal recycling, nanotechnology and the molten salt electrolysis. After the workshop, Prof. Friedrich was a guest of Firmi visited Fero Promet and RMD 19 Thermoplastik in Uzice in order to discuss about the future cooperation.



Srecko Stopic

Recycling of Rare Earth Elements from NdFeB Magnet with Molten Salt Electrolysis

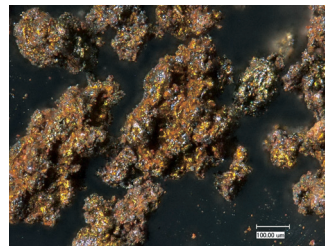


One of the highest utilizations of rare earth elements (REE) resides in neodymium-iron-boron (NdFeB) permanent magnets. Therefore, recycling of NdFeB magnets could play an important role in securing REE supply in the future. Since REE constitutes only a maximum of 30% in NdFeB magnets, its recoverability depends on the separation of iron, which is the major element present in the magnet. Using oxidation that is later followed by carbothermic reduction. This process results in the separation of REE in the form of rare earth oxide (REO), with REE contents of 96% (left-panel picture). This REO, which is specifically named MRDO (magnet recycling-derived oxide), will then be used for molten salt electrolysis. The current state-of-the-art of REE molten salt electrolysis (MSE) lies in the use of a single, high-purity REO oxide in the electrolyte (artificial mixed oxide), for example, $\text{NdF}_3\text{-LiF-Nd}_2\text{O}_3$. The novelty of this work is the development of multiple REE electrolysis using REO that is directly synthesised from a magnet. The consequence of this is that the REO consists of a complex mixture of Nd, Pr, Dy oxides and impurities (Fe and B oxides). Different electrochemical analyses were used to analyse the system. A comparison study with mixed-REO that was made from high-purity oxides revealed that the MRDO-containing system delivers higher current (with the same potential) and has higher current efficiency. XRD analysis reports that Nd, Pr and Dy were able to be recovered on the metal deposit after electrolysis, with a small amount of Fe. Moreover, the MRDO-containing electrolyte produces a more locally concentrated metal deposition (right-panel (b)), than the artificial mixed-REO system (right-panel (a)).

Laras Prasakti

Gold Recovery from Waste Printed Circuit Boards via Thiourea Leaching

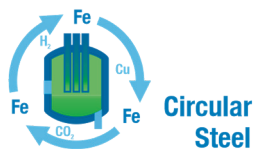
Gold is widely used in electronic devices due to its excellent electrical conductivity and corrosion resistance, making waste printed circuit boards (WPCBs) an important secondary resource. Thermal, mechanical and chemical pretreatment steps are applied to remove non-target materials and base metals and obtain a gold-enriched fraction. Gold is subsequently leached using thiourea as an alternative to conventional highly corrosive leaching systems such as aqua regia. Ferric sulfate is used as the oxidizing agent and sulfuric acid for pH control. During leaching, Au^0 is oxidized by Fe^{3+} and stabilized by thiourea through the formation of the soluble gold(I)-thiourea complex $[\text{Au}(\text{CS}(\text{NH}_2)_2)_2]^+$. As thiourea is susceptible to oxidation and degradation, the effects of reagent concentrations, pH, redox potential, temperature and different additives on gold dissolution and thiourea stability are systematically investigated. Electrochemical analyses are additionally applied to study the reaction kinetics and underlying mechanisms of gold dissolution and thiourea oxidation. Finally, dissolved gold is recovered from the leach solution through precipitation.



Zixi Gao

DGM "Circular Steel": Research Cluster Launch

The Circular Steel - Research Training Group (RTG) Project, funded by the DFG (commenced on April 2026 for 5 years with the option of a second phase), is being carried out in collaboration among 12 RWTH institutes and FZ Jülich. The goal is to establish a sustainable recycling process chain for the accumulating steel scrap for attaining carbon neutrality by 2050. Steel scrap is being contaminated with a several tramp elements due to the advanced applications which requires severe alloying element additions. Owing to electrification of numerous application domains, copper content in the steel scrap is rising progressively over the decades. Copper (Cu) plays a prime role as a contaminant by restraining the usage of steel scrap as a raw material in establishing circular economy. It causes an undesirable phenomenon called "hot shortness" in the subsequent forming processes even at a minimal level of concentrations ($\approx 0.15\%$ Cu). In addition to Cu, non-metallic inclusions (NMIs) are specifically problematic since they have a detrimental effect on the steel quality. It is thus vital to keep the level of impurities as low as possible. The IME is determined to develop a new process with the feasibility to remove such contaminants for producing high-performance steels from poor-quality steel scrap charge materials and to ensure the recyclability for establishing a circular economy via Electro Slag Remelting (ESR) and Vacuum Metallurgy methods.



Ajithkumar Selvan

Dr.-Ing. Alexander Birich bids farewell to the IME



After more than eleven years at IME, Dr.-Ing. Alexander Birich will be leaving the institute and will join the Research Division of Aurubis in Hamburg this September.

Dr. Birich joined IME in April 2015 as a research associate. While still completing his PhD, he took on the responsible position of Chief Engineer on October 1, 2018, succeeding Dr.-Ing. Reinhard Fuchs.

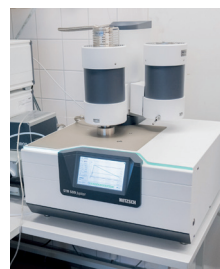
As Chief Engineer, Dr. Birich has played a major role in shaping the development of IME over the past years. In addition to his key organizational and technical responsibilities, he made significant contributions to the successful development and implementation of numerous research and industry projects. His scientific

work includes more than 41 peer-reviewed journal and conference publications. Dr. Birich also made important contributions to teaching. He developed two new courses, "Battery Science and Technology" and "Circular Metallurgy: Case Study – E-Car Recycling," while teaching two additional courses at IME and serving as a guest lecturer in Shanghai and Bangkok. In recognition of his outstanding contribution to the internationalization of RWTH Aachen University, he received the "IntSpire" Award in 2023.

We would like to sincerely thank Alexander Birich for his many years of outstanding dedication to IME. With great commitment and enthusiasm, he has played a decisive role in shaping the development of our institute for more than a decade. We wish him all the best and every success in his new role at Aurubis in Hamburg!

Alexander Birich

New Thermal Analysis under Hydrogen



Since April, the new NETZSCH STA 509 Jupiter has expanded the thermal analysis capabilities at IME. Thanks to the H₂Secure concept, TGA, DTA, and DSC measurements can now also be performed under hydrogen and water-vapor-containing atmospheres. This enables the targeted investigation of both oxidizing and reducing process conditions.

Special thanks to NETZSCH-Gerätebau GmbH for providing the instrument and for the active exchange and collaboration throughout the cooperation.

Moritz Templin

Company Outing 2026

On May 29, 2026, we enjoyed our annual company outing in beautiful summer weather. At 9:00 a.m., we set off together by bus from Aachen to Maasmechelen. After a short briefing, we put on our life jackets, grabbed our paddles, and the approximately 13-kilometre river rafting tour along the Dutch-Belgian border could begin. About halfway through the tour, we stopped at the Summer Bar for a well-deserved break to replenish our energy and water supplies. To round off the day, we headed back to Aachen, where we ended an eventful and exciting day with refreshing drinks and delicious barbecue food – a well-deserved way to wrap up a great day together.

Jan Keuneke

High-purity tellurium recovery from thermoelectric Bi₂Te₃ materials

In June 2025, the BMWK project RecycleTEAM was successfully completed. The objective of the project was the development of a recycling process for thermoelectric Bi₂Te₃ materials, with a particular focus on the recovery of high-purity tellurium. For this purpose, the precipitated tellurium dioxide (TeO₂) was initially reduced using hydrogen, and the resulting crude metal was subsequently purified through fractional crystallisation using the Cooled Finger process.

The developed process enables a complete process chain from end-of-life thermoelectric modules to the production of tellurium with 99.999% (5N) purity. The results obtained within the project also form the foundation of my doctoral thesis. Building upon the project outcomes, the reduction kinetics, purification efficiency, and underlying mechanisms of fractional crystallisation using the Cooled Finger process are systematically investigated. The overall outcome provides a novel pathway for treating Bi₂Te₃ wastes.



Hanwen Chung