



International scientific conference

**MININGMETALTECH 2024 – THE MINING
AND METALS SECTOR: INTEGRATION
OF BUSINESS, TECHNOLOGY
AND EDUCATION**

November 28–29, 2024

Volume 1



IZDEVNIECĪBA
BALTIJA
PUBLISHING

2024

International scientific conference “MININGMETALTECH 2024 – The mining and metals sector: integration of business, technology and education” : conference proceedings (November 28–29, 2024. Riga, the Republic of Latvia). Riga, Latvia : “Baltija Publishing”, 2024. Vol. 1. 368 pages.

Program Committee

Chairman of the program committee of the conference – **Yuriy RYZHENKOV**, General Director, METINVEST HOLDING LLC

Vice-chairman of the program committee of the conference – **Oleksandr POVAZHNY**, DSc (Economics), Professor, Rector, “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC” LLC

Secretary of the program committee of the conference – **Maksym KARAKAI**, PhD (Public Administration), Scientific Secretary, “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC” LLC

Oleksandr MYRONENKO – Operations Director, METINVEST HOLDING LLC

Tetyana PETRUK – Director of sustainable development and interaction with personnel, METINVEST HOLDING LLC

Olga OVCHYNNIKOVA – Director of economics and development of business systems, METINVEST HOLDING LLC

Yuliya DANKOVA – Financial director, METINVEST HOLDING LLC

Svitlana ROMANOVA – Director of legal support, METINVEST HOLDING LLC

Andriy YEMCHENKO – PhD (Engineering), Director of technical development, METINVEST HOLDING LLC

Dmytro TEVELEV – Adviser to the general director, METINVEST HOLDING LLC

Oleksandr PODKORYTOV – Director of technology and quality, METINVEST HOLDING LLC

Pavlo UZBEK – Director of the LP, IS, HC and EP department, METINVEST HOLDING LLC

Vitaly KOVALENKO – Director of the Department of Sustainable Development and Environmental Management, METINVEST HOLDING LLC

Marya VASILYEVA – General director, “Metinvest Sichstal” LLC

Gregory MASON – member of the Supervisory Board

Andrii KOSTRYZHEV – Project Manager – Material Characterization Scientist, The University of Queensland

Conference organizing committee

The head of the organizing committee of the conference – **Volodymyr KUKHAR**, DSc (Engineering), Professor, Vice-rector for research work, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Deputy head of the conference organizing committee – **Nataliya REKOVA**, DSc (Economics), Professor, First vice-rector – vice-rector for educational work, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Secretary of the organizing committee of the conference – **Khrystyna MALII**, PhD (Engineering), Head of the research department, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Volodymyr PASHYNSKY – DSc (Engineering), Associate Professor, Head of the Department of Materials Science and Applied Mechanics, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Vyacheslav KAMENETS – PhD (Engineering), Associate Professor at the Department of Mining, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Pavlo SAHAIDA – DSc (Engineering), Associate Professor, Professor at the Department of Digital Technologies and Project-Analytical Solutions, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Oleksiy KOYFMAN – PhD (Engineering), Associate Professor, Head of the Department of Automation, Electrical and Robotic Systems, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Oleg KRUZHYLKO – DSc (Engineering), Professor, Professor at the Department of Labor Safety and Environmental Protection, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Dmytro PIKARENYA – DSc (Geology), Professor, Professor at the Department of Labor Safety and Environmental Protection, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Nataliia HRUDKINA – DSc (Engineering), Associate Professor, Head of the Department of Natural Sciences and General Engineering, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Dmytro ZHERLITSYN – DSc (Economics), Professor, Professor at the Department of Digital Technologies and Project-Analytical Solutions, LIMITED LIABILITY COMPANY “TECHNICAL UNIVERSITY “METINVEST POLYTECHNIC”

Each author is responsible for content and formation of his/her materials.

The reference is mandatory in case of republishing or citation.