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Editorial

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Dear readers, authors, and reviewers,

It is with great pleasure that we introduce Metalurgija, Volume 65, Issue 1 (2026), marking both continuity and renewal under the editorial leadership of the Croatian Society for Materials Protection. This issue represents not only the beginning of a new editorial cycle but also the reaffirmation of our shared mission: to serve as an international platform for high-quality scientific exchange, promoting excellence, innovation, and collaboration across the broad field of metallurgy and materials engineering.

Building upon more than six decades of tradition, Metalurgija continues to evolve in response to the changing landscape of science and technology. In an era defined by digital transformation, global connectivity, and sustainable development, the journal remains dedicated to publishing research that bridges theoretical understanding and industrial application. We particularly value contributions that integrate experimental results, computational modeling, and novel analytical approaches to address current challenges in materials design, processing, and performance.

The journal's multidisciplinary scope spans metallurgy, materials science, physics, chemistry, and mechanical engineering, reflecting the interconnected nature of modern research. Metalurgija continues to uphold the highest standards of methodological rigor, peer review, and editorial integrity values that have earned it lasting respect within the international scientific community.

This issue features ten papers in total, eight original research articles and two review papers thematically organized into three key areas that collectively illustrate the diversity and depth of current research in metallurgy and materials engineering. The studies presented here not only contribute to the scientific understanding of metals and alloys but also address technological challenges faced by modern industry from advanced manufacturing to recycling and sustainability.

The first section focuses on the development and characterization of aluminum alloys, emphasizing their critical role in lightweight structural applications. The papers explore how thermal and mechanical treatments influence microstructure and performance, covering topics such as residual temperature effects in cast-rolled sheets, microstructural evolution during annealing, combined solution–ECAP–aging processes, and modeling of uneven cooling during horizontal direct chill casting. Together, these studies demonstrate continuous innovation in alloy design aimed at achieving optimal combinations of strength, ductility, and corrosion resistance.

The second group of papers is dedicated to the analysis of metallic surfaces and structures using advanced experimental and diagnostic techniques. The contributions in this section address fracture mechanisms, quenching behavior, and the evaluation of mechanical integrity under various operational conditions. Particular attention is given to non-destructive testing methods and the design of mobile inspection systems for internal pipeline monitoring. These works highlight the growing importance of structural health monitoring and real-time analysis in ensuring the safety and reliability of engineering systems.

The final section presents research on zinc-based alloys and processing residues, demonstrating how computational modeling and chemical engineering approaches can enhance efficiency and sustainability in materials processing. The studies include the use of machine learning algorithms for predicting mechanical properties of zinc alloys and the leaching of zinc ferrite residues using sulfuric acid. These contributions exemplify the integration of artificial intelligence and green chemistry in metallurgical research fields that will continue to shape the future of materials production and recovery.

Collectively, the ten papers in this issue reaffirm Metalurgija's position as a respected international journal committed to disseminating scientifically rigorous and practically relevant research. We believe that fostering collaboration among academia, industry, and research institutions is essential to addressing the global challenges of materials sustainability, circular economy, and advanced manufacturing.

We express our sincere gratitude to all authors, reviewers, and readers for their dedication and trust. Your continued engagement ensures the vitality and quality of Metalurgija, enabling the journal to evolve as a vibrant forum for scientific communication and professional exchange.
Finally, we wish to honor the memory of Acad. Ilija Mamuzić, D. Sc., D.h.c., Prof. h.c., whose visionary leadership over four decades transformed Metalurgija into a respected international platform for metallurgical science. His legacy of excellence, curiosity, and mentorship remains an enduring inspiration to our editorial team and to generations of researchers who continue to build upon his work.

Editors:
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