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Minerals and Mineral Materials

Editorial

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Introduction to the highlights of articles in Volume 3, Issue 1

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The Journal of *Minerals and Mineral Materials* (*MMM*) is pleased to announce the successful launch of 28 articles, marking the debut of three volumes and one issue in the first quarter of 2024. We extend our heartfelt gratitude to the reviewers, authors, and all supporters whose contributions have fostered the growth of the *MMM* journal. In light of these achievements, we aim to spotlight the highlights of the articles published in this issue, hoping to garner further interest and invite valuable feedback.

The first article, titled "A Review of Mechanical Properties and Carbonation Behavior Evolution of Lime Mortar for Architectural Heritage Restoration", delves into crucial aspects of preserving architectural heritage[1]. The second, "35 Years of Lessons Learned Designing, Building, and Monitoring Passive Treatment Systems for Mining Influenced Water (Part 1)", offers insightful reflections drawn from extensive experience[2]. Lastly, "Synthesis and Characterization of Hydroxamic Acid N,3-Dihydroxy-2-Naphthamide and Its Copper (II) Complex Per Keto/Enol Forms and Rare Earth Flotation", presents innovative research on chemical synthesis and its applications[3]. These remarkable contributions come from esteemed authors including Dr. Zhenmeng Chen, Hui Liu, Lingjie Xu, Wei Ge, James J. Gusek, Ben Suslavich, Rick LaDouceur, Abdul Mamudu, and Courtney Young. We sincerely appreciate these honored authors and offer heartfelt congratulations on the successful publication of Volume 3, Issue 1 of the Journal of *MMM*.

The first article, titled "A Review of Mechanical Properties and Carbonation Behavior Evolution of Lime Mortar for Architectural Heritage Restoration", thoroughly explores the mechanical properties and carbonation mechanisms crucial for the successful restoration and preservation of architectural heritage. Lime mortar has historically been pivotal in connecting, safeguarding, and embellishing buildings, making it fundamental to architectural heritage preservation. This paper comprehensively examines the various factors influencing mechanical properties of lime mortar and delves into its carbonation principles. By analyzing aspects such as water-binder ratios, aggregate mineralogy and particle size, and the effects of inorganic and organic additives, the study offers valuable insights into the behavior of lime mortar. Particularly noteworthy is the elucidation of the intricate role of organic additives in its carbonation process. Additionally, the article proposes strategies for enhancing its mechanical properties, thereby bolstering the compatibility and durability of materials used in ancient building restoration. This comprehensive review brings its intrinsic characteristics to light, emphasizing its indispensable role in preserving architectural heritage amidst contemporary challenges.

The second article, "35 Years of Lessons Learned Designing, Building, and Monitoring Passive Treatment Systems for Mining-Influenced Water (Part 1)", examines the evolution of passive treatment systems for addressing the challenges posed by mining-influenced water. While the remediation of acidic water containing elevated dissolved metals is a natural process, the emulation of such processes for mining-influenced water treatment is a relatively recent endeavor. Termed "passive treatment", this technology integrates various disciplines including biogeochemistry, hydraulics, microbiology, and agronomics. The complexity inherent in the design, construction, and operation of passive treatment systems often leads to valuable learning experiences and occasional setbacks. Through case histories and mini-case studies, this review narrates the learning journey of a mining engineer and underscores the importance of small-scale testing in accumulating valuable insights at minimal risk. By sharing experiences and lessons learned, the article contributes to ongoing advancements in passive treatment system design and implementation, thus fostering continuous improvement and knowledge dissemination in the field.

The third article, "Synthesis and Characterization of Hydroxamic Acid N,3-Dihydroxy-2-Naphthamide and Its Copper (II) Complex per Keto/Enol Forms and Rare Earth Flotation", presents a comparative study of hydroxamic acid collectors aimed at enhancing the flotation of rare earth minerals (REMs). Flotation, a widely utilized beneficiation process, encounters challenges when applied to REMs due to their dilute composition and finer grain sizes. To address these challenges and improve REM extraction efficiencies, hydroxamic acids are commonly employed as flotation collectors. This study investigates the synthesis, characterization, and performance assessment of two hydroxamic collectors, salicylhydroxamic acid (SHA) and N,3-dihydroxy-2-naphthamide (H_2O_5). Multiple synthesis approaches were explored for H_2O_5 due to the absence of a documented synthesis route. Structural and characteristic data were gathered, facilitating a comparative analysis of their flotation behavior. Molecular modeling using Spartan software provided insights into the electrostatic potential of dentate groups in different tautomeric forms, revealing the transition from keto to enol forms upon chelation with Cu^{2+} ions. Experimental results showed that H_2O_5 exhibited a 23% increase in REM recovery by flotation compared to SHA at similar reagent dosages, thereby enhancing understanding of the behavior of hydroxamic acid collectors and offering insights for optimizing REM flotation processes.

In this issue, we are pleased to present three papers contributed by authors from diverse geographical backgrounds. These papers explore distinct topics spanning mineral materials, environmental engineering, and rare earth flotation. Through this compilation, we strive to introduce you to innovative ideas and facilitate engagement with the latest academic advancements, sparking new insights and inspiring fruitful

discussions within the academic community.

DECLARATIONS

Authors' contributions

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