

SEG 2024 Conference: Sustainable Mineral Exploration and Development

The Essential Role of High-Volume Base Metals: Catalysts of Modern Industry

Chawanangwa S. Mwansa

University of Zambia, Lusaka, Zambia

The demand for vital high-volume base metals, including copper, aluminum, nickel, zinc, and lead, continues to shape industries worldwide due to their indispensable roles in various sectors. This abstract provides a comprehensive overview of these metals, highlighting their significance, applications, and evolving market dynamics. Copper, known for its conductivity and malleability, is crucial in electrical wiring, plumbing, and electronics. Its role in renewable energy systems, such as solar panels and wind turbines, underscores its importance in the transition to sustainable energy. Aluminum, prized for its light weight and corrosion resistance, dominates industries like aerospace, automotive, and construction. Its recyclability further enhances its appeal in eco-conscious markets. Nickel, essential in stainless steel production, is experiencing increased demand due to its vital role in electric vehicle batteries and emerging technologies like hydrogen fuel cells. Zinc, valued for its anti-corrosive properties, finds widespread use in galvanizing steel, alloy production, and the pharmaceutical sector. Lead, despite declining usage in some applications due to environmental concerns, remains indispensable in batteries for automotive and industrial purposes. Factors such as technological advancements, geopolitical dynamics, and sustainability initiatives are reshaping the landscape of these base metals. The transition to electric vehicles, infrastructure development, and renewable energy expansion are driving demand for these metals, with implications for supply chains, pricing, and environmental regulations. The presented data provides valuable insights into the multifaceted nature of vital high-volume base metals, highlighting their pivotal roles in modern economies and their evolving trajectories in a rapidly changing world.