



Keywords: Mineral processing; Innovation; Commination; Separation techniques; Sustainability; Digitalization

Introduction

Mineral processing serves as the cornerstone of the mining industry, facilitating the extraction and refinement of valuable minerals from ore deposits. From ancient civilizations to modern industrial societies, the quest for minerals has driven human exploration and innovation. Over the centuries, mineral processing techniques have evolved from rudimentary methods to sophisticated technologies, reflecting advancements in science, engineering, and environmental

Significance of Innovations: The advancements highlighted in this review hold significant implications for the mining industry. From improved comminution technologies to sustainable practices and digitalization, these innovations have the potential to enhance efficiency, reduce environmental impacts, and drive operational excellence. By embracing these innovations, mining companies can optimize resource extraction, reduce costs, and improve their competitive edge in a rapidly evolving market.

Sustainability and Environmental Impact: A recurring theme throughout this review is the growing emphasis on sustainability and environmental stewardship in mineral processing. Sustainable practices, such as water-saving technologies, energy-efficient processes, and tailings management strategies, are essential for minimizing the ecological footprint of mining operations. However, achieving

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