

# Complexities and Opportunities for Gold Processing in a Changing Environment

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## **ABSTRACT**

The gradual exhaustion of free milling resources of gold ores has made the gold industry increasingly reliant on complex, refractory gold ores and other non-traditional sources such as leach tailings and electronic waste. However, the extraction of gold from these sources has been associated with significant challenges due to the inability of traditional methods to deal with the complex mineralogical characteristic of such feed material. While traditional pretreatment methods such as roasting, pressure oxidation, bio-leaching, etc. and the integration and combination of such techniques in alternative flow sheets have remained key, consideration is however, now also being given to non-conventional techniques such as mechano-activation, cavitation and ultrasound pre-treatment processes prior to cyanidation. At the same time, the extraction of metals has also come under severe scrutiny from both regulators and the public leading to the establishment of stringent environmental laws that have also had a significant impact on the approach to gold processing. These, together with an increasing focus on the circular economy and the drive for responsibility in mining, have forced mining companies and researchers to look at alternative and environmental friendly reagents and to consider cleaner production and process re-engineering for sustainability in gold extraction. This paper, therefore, looks at the challenges in gold extraction and the opportunities in research and development that have come about as a result of some of the changes happening in the gold hydrometallurgical processing sector.