

Role of Chemical Metallurgy in Extracting Metal Values from Lean and Complex Minerals

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Abstract

In recent years due to increasing use of huge quantities of high grade ores and their fast depletion in the mines, it has been essential to mine low grade minerals and suitably utilize those to produce the required metals to meet our increasing needs. As a number of these lean minerals do not respond properly to the mineral beneficiation techniques, it has been necessary to apply various chemical processing technologies to extract the metal values from these. In this review paper, an account on various chemical metallurgy processes for treating such lean and complex minerals have been given. It is emphasized that, by suitably changing various process parameters, it is possible to extract the metal values economically. Different chemical processing methods like acid leaching with and without pressure, alkali leaching, applying different roasting processes like aerial roasting, salt roasting, reduction roasting, etc. followed by aqueous leaching and bio-leaching to extract the desired metal values have been described and discussed briefly with specific examples. Some of the commercial practices for extracting the metal values from lean and complex minerals have been briefly mentioned. It is suggested to select and commercially adopt Chemical Metallurgy Processes for treating more and more lean minerals in an environment friendly manner.

Key words: Lean and complex minerals, chemical metallurgy, acid leaching, alkali leaching, roasting and leaching, bio-leaching, commercial processes for treating lean ores.