Reductive bioleaching for metal recovery from oxide ores

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In the past 50 years, biomining has developed into a vibrant and robust “green technology” and reductive bioleaching fits well into this objective as it has a reduced carbon footprint (the bacteria that carry out the processing fix CO_2, like green plants). To date, industrial scale biomining has been applied for dissolution of sulfide ores, but has not yet been used for metal extraction from oxides. The Ferredox process for reductive bioleaching of limonitic laterites for recovery of Ni, Co, Cu, Sc, Mn, Cr, Zn is validated in a laboratory scale proof-of-concept bioreactor. The main operating cost for this process is sulfur (for acid generation and food for the bacteria involved) and analysis of operational expenditure in using this approach for processing laterites has shown that it is economically feasible. Besides limonitic laterites oxidized ores comprise polymetallic deep-sea nodules and crusts, and supergene sulfide deposits. Existing technologies for the exploitation of such ores are costly and result in a large environmental footprint. Biomining seems to be a promissing geobiotechnology for processing oxidized ores and potentially waste.