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# A comprehensive utilization of silver-bearing solid wastes in chalcopyrite bioleaching

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**Abstract:** In this work, two types of abandoned silver-bearing solid wastes of zinc leaching residue (ZLR) and firebrick were used as silver catalysis in chalcopyrite bioleaching by mixed moderately thermophilic culture. Bioleaching results showed that the chosen ZLR and waste firebrick both remarkably promoted chalcopyrite bioleaching, and chalcopyrite was not passivated at high redox potential (more than 600 mV vs. Ag/AgCl) in the presence of silver-bearing solid wastes. The bioleaching residues were subsequently leached by thiourea to recover silver. Results indicated that silver was more easily to be extracted from bioleaching residues than from untreated silver-bearing solid wastes, and high silver recovery of about 90% can be finally achieved. Hence, this work is potentially useful to provide a promising technique for promoting chalcopyrite bioleaching and for comprehensive utilization of silver-bearing solid wastes.

**Keywords:** Chalcopyrite; Bioleaching; Zinc leaching residue (ZLR); Waste firebrick; Comprehensive utilization

## 1. Introduction

Chalcopyrite ( $\text{CuFeS}_2$ ) accounts for more than 70% of the total copper reserves in the world, and is mainly processed by pyrometallurgy (Li et al., 2013). Bioleaching is considered as a promising alternative technology to conventional pyrometallurgy in

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