Electrochemical behaviour of L-cysteine on massive chalcopyrite (CuFeS₂) bioleached by leptospirillum ferrooxidans

Yue Liu¹, Hongai Zheng^{1,*}, Yiheng Zhou¹, Mengqian Wang¹, Jianshe Liu², Daquan Zhang¹, Lizhi Zhang³

¹ College of Environmental and Chemical Engineering, Shanghai University of Electric Power

² 3GA 30332, United States

³ Department of Orthopedic Surgery, ShangHai YangPu District Central Hospital, YangPu Hospital affiliated to TongJi University

*E-mail: zhenghongai@shiep.edu.cn

doi: 10.20964/2019.10.07

Received: 18 January 2019 / Accepted: 15 July 2019 / Published: 30 August 2019

This study introduces a mechanism for speeding up the bioleaching process. We examine the effects and kinetics of L-cysteine on the bioleaching of chalcopyrite via Potentiodynamic polarisation, electrochemical impedance spectroscopy (EIS) and cyclic voltammetry tests in a Leptospirillum ferrooxidans-dominated culture. Both the polarisation curves and the EIS show that adding L-cysteine improves the bioleaching speed, but does not change the controlled step. In addition, the results of the cyclic voltammetry test reveal that the anodic and cathodic current signals of the electrodes decrease. Furthermore, all the oxidation peak potentials move positively, and the oxidation peaks of the intermediate species (CuxS) persist throughout the entire bioleaching process.

Keywords: Electrochemical; Leptospirillum ferrooxidans; L-cysteine; Bioleaching; Chalcopyrite

[FULL TEXT](#)

© 2019 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).