



HAL
open science

Influence of CO₂ supplementation on bioleaching kinetics in stirred tank reactor (STR)

Anne-Gwenaëlle Guezennec, Catherine Joulian, Jérôme Jacob, Françoise Bodénan, Patrick d'Hugues

► **To cite this version:**

Anne-Gwenaëlle Guezennec, Catherine Joulian, Jérôme Jacob, Françoise Bodénan, Patrick d'Hugues. Influence of CO₂ supplementation on bioleaching kinetics in stirred tank reactor (STR). Biohydrometallurgy '18, Jun 2018, Windhoek, Namibia. hal-01784525

HAL Id: hal-01784525

<https://hal-brgm.archives-ouvertes.fr/hal-01784525>

Submitted on 3 May 2018

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Influence of CO₂ supplementation on bioleaching kinetics in stirred tank reactor (STR)

Anne-Gwénaëlle Guezennec*, C. Jouliau, J. Jacob, F. Bodenan, P. d'Hugues

Water, Environment & Ecotechnologies Division, BRGM - 3, av. Claude Guillemin, BP 36009, 45060 Orléans Cedex 2, France - +33 (0)2 38 64 31 36, a.guezennec@brgm.fr

ABSTRACT

In bioleaching processes using autotrophic bacteria, CO₂ is the carbon source for the growth of the microorganisms and its availability is dependent on gas mass transfer in the bioreactor. In this study the demand in CO₂ was investigated during bioleaching of several sulfidic materials (pyritic tailings, Cu concentrate, coal waste) in STR using the "BRGM-KCC" bacterial consortium. The results show (i) that Fe oxidation (and thus microbial activity) is delayed when air is injected without CO₂-supplementation, and (ii) that CO₂-supplementation improves leaching kinetics. The study proposes also a methodology to determine G/L transfer components and to assess CO₂ limitations in the system. It shows that the microorganisms are not only sensitive to the transfer rate of CO₂ from the gas to the liquid phase, but also to the availability of CO₂ in solution.

Key-words: bioleaching, carbon dioxide, CO₂-supplementation, mass transfer, sulphide