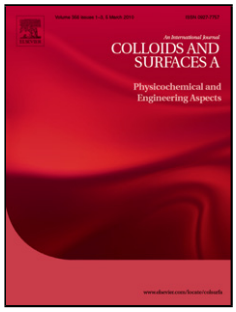


Title: THE RELATIONSHIP BETWEEN ENTHALPY OF IMMERSION AND FLOTATION RESPONSE

Authors: J. Taguta, C.T. O'Connor, B. McFadzean

PII: S0927-7757(18)30831-8
DOI: https://doi.org/10.1016/j.colsurfa.2018.08.059
Reference: COLSUA 22774

To appear in: *Colloids and Surfaces A: Physicochem. Eng. Aspects*

Received date: 26-6-2018
Revised date: 21-8-2018
Accepted date: 24-8-2018

Please cite this article as: Taguta J, O'Connor CT, McFadzean B, THE RELATIONSHIP BETWEEN ENTHALPY OF IMMERSION AND FLOTATION RESPONSE, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* (2018), https://doi.org/10.1016/j.colsurfa.2018.08.059

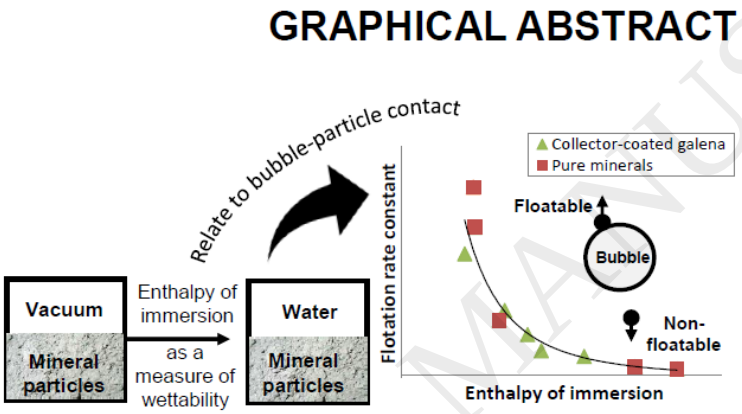
THE RELATIONSHIP BETWEEN ENTHALPY OF IMMERSION AND FLOTATION RESPONSE

[*]J. Taguta, and C.T. O'Connor, and B. McFadzean

Centre for Minerals Research, University of Cape Town, Rondebosch, Cape Town, South Africa,

([*]Corresponding author: tgtjes001@myuct.ac.za, +27845441540)

Graphical Abstract



ABSTRACT

The enthalpy of immersion is the heat change arising from the replacement of the solid-gas interface with the solid-liquid interface when a solid surface is immersed in a liquid. Although immersion calorimetry has been established as a reliable means of determining wettability of solid surfaces, it has found only limited applications in flotation research where wettability of mineral ores is a key variable. In this study, precision solution calorimetry was employed to measure the enthalpies of immersion of different minerals in water. These values were then related to the first-order flotation rate constants as determined by microflotation. The same measurements were also made on sulphide minerals whose surfaces were modified using different percentage coverages of potassium amyl xanthate collector.

It was found that there was a strong inverse relationship between the enthalpy of immersion of the minerals studied and their wettability as indicated by their rates of flotation in a microflotation cell. In addition, a critical enthalpy of