

# Accepted Manuscript

Some physicochemical aspects of water-soluble mineral flotation

Zhijian Wu, Xuming Wang, Haining Liu, Huifang Zhang, Jan D. Miller

PII: S0001-8686(16)30011-2  
DOI: doi: [10.1016/j.cis.2016.06.005](https://doi.org/10.1016/j.cis.2016.06.005)  
Reference: CIS 1663

To appear in: *Advances in Colloid and Interface Science*



Please cite this article as: Wu Zhijian, Wang Xuming, Liu Haining, Zhang Huifang, Miller Jan D., Some physicochemical aspects of water-soluble mineral flotation, *Advances in Colloid and Interface Science* (2016), doi: [10.1016/j.cis.2016.06.005](https://doi.org/10.1016/j.cis.2016.06.005)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Some physicochemical aspects of water-soluble mineral flotation

Zhijian Wu<sup>a</sup>, Xuming Wang<sup>b</sup>, Haining Liu<sup>a</sup>, Huifang Zhang<sup>a</sup>, Jan D. Miller<sup>b,\*</sup>

<sup>a</sup> Laboratory of Salt Lake Resources and Chemistry, Qinghai Institute of Salt Lakes, Chinese Academy of Sciences, Xining 810008, China

<sup>b</sup> Department of Metallurgical Engineering, College of Mines and Earth Sciences, University of Utah, 135 S 1460 E, Salt Lake City, UT 84112, USA

\* Corresponding author. Tel.: +1-801-581-5160; fax: +1-801-581-4937. E-mail address: Jan.Miller@utah.edu (J.D. Miller).

### Abstract

Some physicochemical aspects of water-soluble mineral flotation including hydration phenomena, associations and interactions between collectors, air bubbles, and water-soluble mineral particles are presented. Flotation carried out in saturated salt solutions, and a wide range of collector concentrations for effective flotation of different salts are two basic aspects of water-soluble mineral flotation. Hydration of salt ions, mineral particle surfaces, collector molecules or ions, and collector aggregates play an important role in water-soluble mineral flotation. The adsorption of collectors onto bubble surfaces is suggested to be the precondition for the association of mineral particles with bubbles. The association of collectors with water-soluble minerals is a complicated process, which may include the adsorption of collector molecules or ions onto such surfaces, and/or the attachment of collector precipitates or crystals onto the mineral surfaces. The interactions between the collectors and the minerals include electrostatic and hydrophobic interactions, hydrogen bonding, and specific interactions, with electrostatic and hydrophobic interactions being the common mechanisms. For the association of ionic collectors with minerals with an opposite charge, electrostatic and hydrophobic interactions could have a synergistic effect, with the hydrophobic interactions between the hydrophobic groups of the previously associated collectors and the hydrophobic groups of oncoming collectors being an important attractive force. Association between solid particles and air bubbles is the key to froth flotation, which is affected by hydrophobicity of the mineral particle surfaces, surface charges of mineral particles and bubbles, mineral particle size and shape, temperature, bubble size, etc. The use of a collector together with a frother and the use of mixed surfactants as collectors are suggested to improve flotation.

Key words: Flotation, Water-soluble minerals, Hydration, Hydrophobic interactions, Electrostatic interactions

Download English Version:

<https://daneshyari.com/en/article/590544>

Download Persian Version:

<https://daneshyari.com/article/590544>

[Daneshyari.com](https://daneshyari.com)