Accepted Manuscript

A review of the surface features and properties, surfactant adsorption and floatability of four key minerals of diasporic bauxite resources

Ningning Zhang, Anh V. Nguyen, Changchun Zhou

PII: S0001-8686(18)30022-8
DOI: doi:10.1016/j.cis.2018.03.005
Reference: CIS 1867

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

Please cite this article as: Ningning Zhang, Anh V. Nguyen, Changchun Zhou , A review of the surface features and properties, surfactant adsorption and floatability of four key minerals of diasporic bauxite resources. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Cis(2017), doi:10.1016/j.cis.2018.03.005

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.

ACCEPTED MANUSCRIPT

A review of the surface features and properties, surfactant adsorption and floatability of four key minerals of diasporic bauxite resources

Ningning Zhang[1, 2], Anh V. Nguyen[1]*, Changchun Zhou[2]

1. School of Chemical Engineering, The University of Queensland, Brisbane, Queensland 4072, Australia

2. School of Chemical Engineering and Technology, China University of Mining & Technology, Xuzhou, Jiangsu 221116, China

*Correspondence: anh.nguyen@eng.uq.edu.au (A.V. Nguyen)

ABSTRACT

Diasporic bauxite represents one of the major aluminum resources. Its upgrading for further processing involves a separation of diaspore (the valuable mineral) from aluminosilicates (the gangue minerals) such as kaolinite, illite, and pyrophyllite. Flotation is one of the most effective ways to realize the upgrading. Since flotation is a physicochemical process based on the difference in the surface hydrophobicity of different components, determining the adsorption characteristics of various flotation surfactants on the mineral surfaces is critical. The surfactant adsorption properties of the minerals, in turn, are controlled by the surface chemistry of the minerals, while the latter is related to the mineral crystal structures. In this paper, we first discuss the crystal structures of the four key minerals of diaspore, kaolinite, illite, and pyrophyllite as well as the broken bonds on their exposed surfaces after grinding. Next, we summarize the surface chemistry properties such as surface wettability and surface electrical properties of the four minerals, and the differences in these properties are explained from the perspective of mineral crystal structures. Then we review the adsorption mechanism and adsorption characteristics of surfactants such as collectors (cationic, anionic, and mixed surfactants), depressants (inorganic and organic), dispersants, and flocculants on these mineral surfaces. The separation of diaspore and aluminosilicates by direct flotation and reverse flotation are reviewed, and the collecting properties of different types of collectors are compared. Furthermore, the abnormal behavior of the cationic flotation of kaolinite is also explained in this section. This review provides a strong theoretical support for the optimization of the upgrading of diaspore bauxite ore by flotation and the early industrialization of the reverse flotation process.

KEYWORDS

Diaspore; kaolinite; illite; pyrophyllite; surface potential; surfactant adsorption; flotation

Download English Version:

https://daneshyari.com/en/article/6976591

Download Persian Version:

https://daneshyari.com/article/6976591

Daneshyari.com