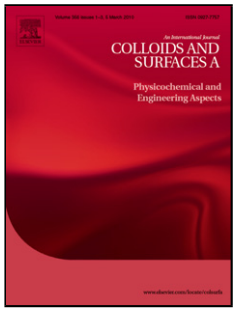


Title: Influence of Magnesium on deflocculated kaolinite suspension: mechanism and kinetic control

Authors: Gnanli Landrou, Coralie Brumaud, Guillaume Habert

PII: S0927-7757(17)31137-8
DOI: https://doi.org/10.1016/j.colsurfa.2017.12.040
Reference: COLSUA 22164

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

Received date: 31-8-2017
Revised date: 15-12-2017
Accepted date: 18-12-2017

Please cite this article as: Landrou G, Brumaud C, Habert G, Influence of Magnesium on deflocculated kaolinite suspension: mechanism and kinetic control, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* (2010), https://doi.org/10.1016/j.colsurfa.2017.12.040

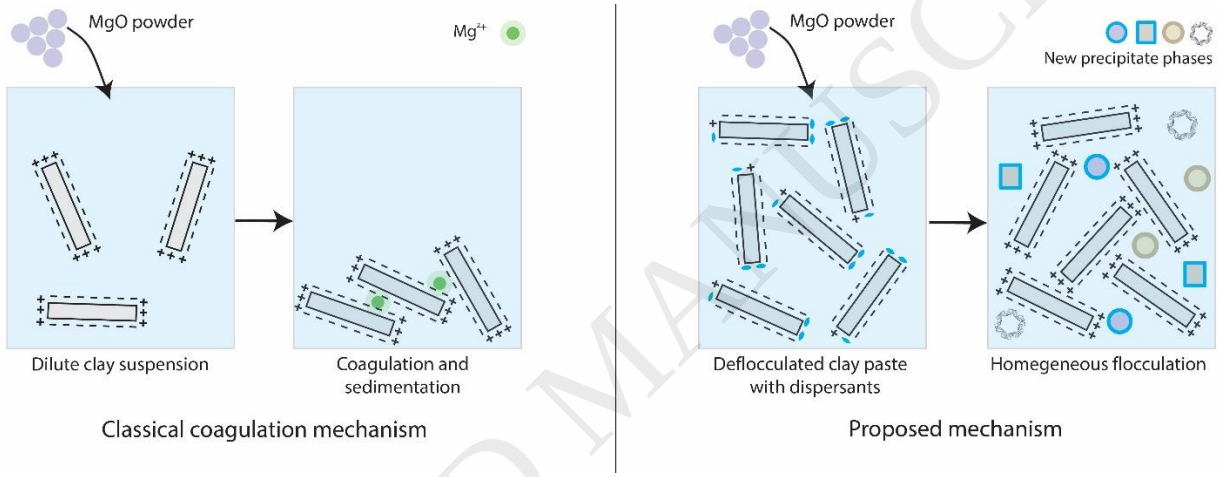
Influence of Magnesium on deflocculated kaolinite suspension: mechanism and kinetic control

Gnanli Landrou [1], Coralie Brumaud [1,] *, Guillaume Habert [1]

[1] Institute of Construction and Infrastructure Management, Chair of Sustainable Construction, Swiss Federal Institute of Technology (ETH Zürich), Stefano-Franscini-Platz 5, Zürich 8093, Switzerland

* Corresponding author: brumaudc@ethz.ch; Tel: +41-44-633-75-57

Graphical abstract



Schematic of classical coagulation mechanism (left) and proposed mechanism (right)

Abstract

In this paper, the interest of magnesium oxide addition in the setting of initially deflocculated kaolinite clay suspension is investigated. The driving mechanisms responsible for this setting behaviour are highlighted through rheological measurements, chemical analysis, phase identification and morphology analysis. The results first show that, by using sodium hexametaphosphate as a dispersant, the setting mechanism is achieved through the precipitation of magnesium phosphate mineral. Magnesium oxide acts as an anti-dispersant for deflocculated suspensions by cancelling the effectiveness of the dispersant. Furthermore, the results show that the variation in dispersant content and the molar ratio Mg/P are the key parameters for a mastered control of the setting kinetics. Finally, the main findings allow proposing a new setting mechanism in clay systems that is different to classical coagulation mechanism.

Keywords: clay; rheology; setting; coagulation