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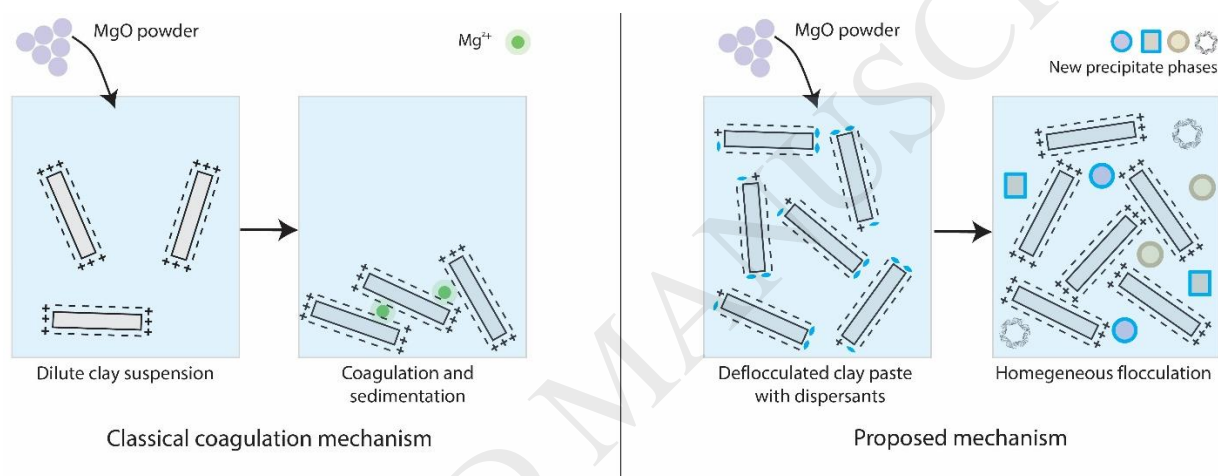
Influence of Magnesium on deflocculated kaolinite suspension: mechanism and kinetic control

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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

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