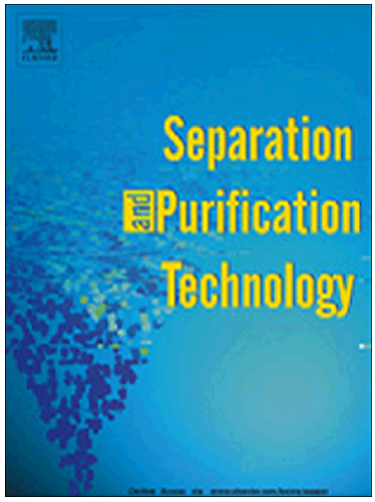

Characterization of floc size and effective floc density of Industrial Papermaking Suspensions

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Characterization of floc size and effective floc density of Industrial Papermaking Suspensions

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Abstract

The effects of the coagulant type and dosage and pH of the medium on the turbidity reduction, zeta potential, settling rates, floc sizes and effective floc density of papermaking suspensions were investigated. The results generally showed that the effective floc density decreases as floc diameter increases and a power law relationship is observed between these two parameters. In general, ferric sulphate tends to produce denser flocs than aluminium sulphate. Furthermore, flocs formed at the optimum dosage were found to be denser than those formed at non-optimum dosages. The relationship between the effective floc density and the floc diameter was found to be a function of the medium pH for both coagulants, aluminium sulphate and ferric sulphate. However, unlike at pH 8 and 9.8, the flocs formed at pH 7 were small and less dense probably due to the dissolution of some precipitated calcium carbonate (PCC) fillers at pH 7. The relationship between residual turbidity and effective floc density results were also investigated and the results showed some inconsistency between these two parameters. This finding highlights the importance of the physical characteristics of floc size and effective floc density in optimizing any coagulation/flocculation process. This work has been very successful in establishing the link between electrokinetic behaviour and the produced floc effective density for the flocculated industrial paper suspensions

Key words: Papermaking suspensions; Coagulation, Floc size; Effective floc density; Zeta potential.

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