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"Gheorghe Asachi" Technical University of Iasi, Romania

BENTONITE SYNTHETIC WATER BEHAVIOR DURING COAGULATION-FLOCCULATION PROCESS

Cosmina-Mariana Militaru[1], Alain Liné[2], Ligia Barna[2], Teodor Todinca[1*]

[1]''Politehnica'' University of Timisoara, Faculty of Industrial Chemistry and Environmental Engineering, 6 Pirvan Street, 300223 Timisoara, Romania
[2]Laboratoire d'Ingénierie des Systémes Biologiques et des Procédés, UMR INSA-CNRS 5504, UMR INSA-INRA 792, Institut National des Sciences Appliquées de Toulouse, 135 Avenue de Rangueil, 31077 Toulouse, Cedex 4, France

Abstract

The aim of this work is to characterize the flocculation process of a bentonite synthetic suspension with characteristics close to Bega River from Timisoara, Romania. The time stability of the synthetic suspension was firstly investigated. After a few days of continuous mixing a stable suspension was reached, stability being confirmed by monitoring the main physicochemical parameters (pH, temperature, turbidity, dissolved organic carbon and initial particle size). In order to determine the optimum dose of coagulant, the stable suspension was subjected to jar-test experiments using different doses of alum (5 - 35 $mg \cdot L^{-1}$). For a suspension with initial turbidity <10 NTU, an optimum coagulant dose of 30 $mg \cdot L^{-1}$ was determined. The particle size distribution by particle number and weighted by size in a 1 L jar during different mixing intensities (45, 90 and 150 rpm) has been investigated. The variation of bentonite-alum flock size was measured using a light scattering method. Results showed that the average flock size (d_{50}) increases with increasing flocculation time up to a maximum value of 165.39 µm due to primary aggregation and then decreases due to flock breakage. The Argaman-Kauffman model fitted very well the experimental data, confirming the utility of this model in the characterization of flocculation process.

Key words: Argaman-Kauffman model, jar-test, light scattering method, particle size, synthetic suspension

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[*] Author to whom all correspondence should be addressed: E-mail: teodor.todinca@chim.upt.ro