

Utilization of floc characteristics for the evaluation of seawater coagulation process

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ABSTRACT

The principal aim of this study is to analyze a seawater coagulation process by means of the evaluation of flocculation index and fractal dimension of flocs. Floc size was evaluated by flocculation index (FI) and floc shape by fractal dimension. Two coagulation parameters of the coagulant type and the mixing condition were selected to evaluate a seawater coagulation process. The study results indicate that the coagulant type was important for seawater coagulation. The coagulant type affected the kinetics of floc formation, floc size and floc shape. Floc formed fast at use of ferric chloride, while it formed slowly at use of aluminum salts. Ferric chloride and titanium chloride produced bigger flocs than aluminum salts. Flocs formed by use of ferric chloride and titanium chloride were more spherical than Al floc. Fe floc was more insensitive to a change in the coagulant dose and the seawater pH than Al floc. Slow mixing was more important for seawater coagulation than rapid mixing. Tapered flocculation produced bigger flocs than constant flocculation. Increase in slow mixing speed from 20 rpm to 40 rpm resulted in formation of bigger flocs, which was reflected by lower settled turbidity value. On the base of the study results, it can be stated that the evaluation of floc characteristics could be a useful tool in order to optimize the seawater coagulation process.

Keywords: Seawater; Coagulation; Floc; Flocculation index; Fractal dimension

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