

2nd International Conference on

POLLUTION CONTROL AND SUSTAINABLE ENVIRONMENT

October 05-06, 2017 London, UK

Simulation of flocculation process of suspended solids

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Flocculation is one of the most important processes in water and wastewater treatment. It is a complex process, and many factors affect its rate and effectiveness. Due to its complexity, there is a need for continuous research of a fundamental as well as a utilitarian nature. This study reports a computer-simulated investigation of the flocculation rate for the system comprising spherical sol particles and spherical coagulant particles. The quantitative proportions of both particle types remained similar to that observed in natural systems, such as that in wastewater treatment plants. The results of kinetic measurements have been tested in view of first-order and second-order reactions. The influence of the physical properties of the coagulant, such as size, density, mass, and coagulant overdosing and underdosing on the flocculation rate was tested. It was found that within the range described in this paper, the rate of the simulated coagulation process fulfils both the kinetic equation of a first-order reaction, and a second-order reaction. The study revealed that both deficiency and excess of the used coagulant decreased the rate of the coagulation process. It was also found that an increase in the simulated coagulant particle diameter and mass increased the speed of sol destabilisation.

Biography

Regina Wardzyńska has completed her PhD from University of Warmia and Mazury. She has published more than 30 articles. Her main research interests are physico-chemical processes in water and wastewater treatment, computer simulation. She is currently working at Department of Chemistry, University of Warmia and Mazury in Olsztyn Poland.

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