Environmental Engineering and Management Journal

March 2013, Vol.12, No. 3, 503-508
http://omicron.ch.tuiasi.ro/EEMJ/

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EXPERIMENTAL STUDY AND NUMERICAL MODELLING OF THE WATER/OZONE CONTACT SYSTEM IN BUBBLE COLUMNS

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Abstract

The ozone oxidation and disinfection stages constitute important technological phases in the modern systems of water treatment, both as unitary stages as integrated ones into systems that use advanced oxidation processes (AOP). More than half of the water/ozone contact systems used nowadays in the water treatment plants are based on systems of contact in the bubble column. This work here aims at experimentally analysing, in terms of scale, a water-ozone contact system in the bubble column and at its modelling by using the CFD (Computational Fluid Dynamics) technique in order to set up basic parameters for the design of ozone contactors. The experimental data obtained, corroborated with the implementation of the numerical model, enabled the rather accurate estimation of the mass transfer local coefficients at the gas/liquid interface, the results of the model application being largely consistent with the experimental data obtained from the standpoint of the concentrations of ozone dissolved in the system. In this context, the numerical model presented can be considered a useful instrument within the technological design process for the systems of treating water with ozone, and also the departing point for approaching more complex systems.

Key words: Computational Fluid Dynamics, ozone, water treatment

Received: May, 2011; Revised final: January, 2012; Accepted: February, 2012

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