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Ozone reactive flotation of model contaminants contained in recovered papers



June 25th, 2018, Alexandre Herisson defended his doctoral thesis at University Grenoble Alpes prepared under the supervision of the Professor Marc Aurousseau and the co-supervision of Nathalie Marlin, Associate Professor (Grenoble INP-Pagora / LGP2). He presented the results of his research work entitled ***Ozone reactive flotation of model contaminants contained in recovered papers: hydrodynamics and reactivity study.***

The decrease of the recovered paper collection quality and the accumulation of dissolved substances in process water affect the deinking line efficiency and contaminate more and more the liquid effluents. In this context the LGP2 has developed an innovative deinking process, the ozone reactive flotation, to chemically degrade dissolved pollutants in parallel with ink removal.

To better understand the mechanisms involved, air and ozone/oxygen flotation trials have been conducted on three model contaminants selected in a preliminary bibliographic review, in a two-phase gas/liquid system, in the absence of fibers. Experiments have been carried out on two instrumented laboratory pilots: a bubble column operating only with air for the study of the hydrodynamics of the reactor (bubbles size and distribution, gas hold-up) in the presence of dissolved contaminants, and a second one, similar in its conception but built using materials resistant to corrosive gas, dedicated to the study of the oxidation reactions with ozone.

The evaluation of the hydrodynamics related to gas flow and injection system selected, studied with air but supposed to be the same with ozone/oxygen gas mixture, shows that the

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bubble size, with or without contaminants, is optimal for an efficient flotation process. The study of ozone mass transfer and reactivity with the three model contaminants, for several temperatures and ozone concentrations, leads to the calculation of kinetic constants and shows that the contaminants, depending on their nature, have been oxidized or depolymerized. Although the COD of the treated solutions does not decrease a lot after the ozone reactive flotation, the effluent quality has been improved in terms of biodegradability since contaminants are partially degraded.

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