

Press release

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Development of cellulose fibres bleaching with ozone

On September 17, 2021, Etienne Montet defended a doctoral thesis from the Université Grenoble Alpes prepared under the supervision of the Professor Christine Chirat and the Emeritus Professor Dominique Lachenal (Grenoble INP-Pagora / LGP2). He presented the results of his research entitled *Investigation of the consequences of the use of ozone in the bleaching of cellulosic fibres*.

Production of paper grade pulp is still relying on the use of chlorine dioxide in ECF bleaching sequences in spite of the AOX pollutants this process releases in the environment and in paper products. The shift towards the use of TCF bleaching sequences will be necessary and is already made possible by the total substitution of chlorine dioxide for ozone, a greener and more powerful oxidant.

This thesis establishes that an ozone-based TCF bleached pulp can reach brightness and strength properties equivalent to that of a conventional ECF pulp. Furthermore, a UV Resonance Raman spectroscopy study demonstrates the superiority of ozone (associated with hydrogen peroxide) in stabilizing the brightness, compared to the joint use of chlorine dioxide and peroxide. An analysis by direct dissolution of the cellulose in a DMAc / LiCl mixture (8%) and size exclusion chromatography indicates that the mechanical quality of the TCF pulp is preserved because the degradation of cellulose by the different ozone stages is uniform in fibres.

Replacing chlorine-based bleaching chemicals with reagents such as oxygen, hydrogen peroxide and ozone provides significant soda savings in the sequence as oxidized white liquor can be used as alkaline agent in the bleaching alkaline stages without disturbing the recovery cycle of the mill. Although recycling of the bleaching effluent induces an overconsumption of ozone, results presented here show that this may be the most cost-effective scenario. This paves the way for the development of highly competitive TCF bleaching sequences for the production of bleached kraft pulp.

Contacts

christine.chirat@grenoble-inp.fr - dominique.lachenal@grenoble-inp.fr

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