

PRESS RELEASE

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New barrier materials using microfibrillated cellulose



February 14, 2017, Sébastien Raynaud defended his doctoral thesis at University Grenoble Alpes prepared under the supervision of Professor Alain Dufresne (Grenoble INP-Pagora / LGP2) and of Dr David Guérin, Manager Research Unit (Centre Technique du Papier). He presented the results of his research work entitled *Development of new barrier materials using microfibrillated cellulose*.

This study takes place in a context of development of paper-based barrier packaging materials, using microfibrillated cellulose (MFC) that displays renewability, recyclability and biodegradability. Two strategies have been investigated: the wet lamination of a MFC barrier layer on board, and the use of MFC as additive in a water-based barrier coating colour.

The promising use of MFC for the formation of barrier layers has been demonstrated in both cases. The wet lamination of MFC on board led to good oxygen and grease barrier properties, using highly fibrillated MFC. The board-MFC complex presented a strong adhesion after drying, without requiring glue.

For composite barrier coating, in order to obtain low viscosity suspensions leading to high barrier layers, the use of highly fibrillated MFC mixed with a fully-hydrolysed poly(vinyl alcohol (PVOH) with a low degree of polymerisation has been preferred. The addition of MFC in PVOH demonstrated its potential for improving the drying behaviour of water-barrier barrier coating colours. The combined use of MFC and layered silicates evidenced a synergistic effect on their dispersion in a PVOH solution, leading to an improved water vapour barrier while avoiding the formation of aggregates that otherwise damage the oxygen barrier.

The Laboratory of Pulp and Paper Science and Graphic Arts (LGP2) is a joint research unit (UMR 5518) run by the CNRS, Grenoble INP and the Agefpi. It is home to three teams: Biorefinery: chemistry and eco-processes – Multiscale biobased materials – Surface functionalization through printing processes. The research conducted by LGP2 strives to meet society's expectations when it comes to sustainable development (green chemistry, clean processes, recycling, biobased materials, renewable energy) and traceability & safety (functional materials, smart paper and packaging). <http://pagora.grenoble-inp.fr/research/>

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The work contributes to demonstrate the potential of MFC to be used for the formation of barrier layers, paving the way for the development of more sustainable barrier packaging materials.

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