

Use of chromatogeny for the development of barrier and release papers

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Abstract

Cellulose is the major component of papers and boards intended both for printing-writing and packaging, or for specialty materials. The natural hydrophilic characteristic of cellulose is an advantage used in numerous applications, but sometimes it also acts as brake on the development of new usages of papers and boards. If techniques do exist to confer hydrophobic characteristic to papers, they also invariably give a partial hydrophobicity and make repulping and recycling difficult. An innovative green chemistry process called chromatogeny can solve these issues. Chromatogeny is a solvent free grafting process that brings strong hydrophobicity to papers and boards letting their end of life untouched. This process takes advantage of the fast reaction times and of the minimal use of reagent to be performed at low exploitation costs on roll to roll machines.

It can be applicable both to uncoated and coated papers. In the case of uncoated papers and boards, it aims at bringing water repellence while keeping their recyclability and biodegradability. In the case of coated papers, it aims at protecting water sensitive barrier layers from moisture developing high barrier properties, but in this case, a coated layer with hydroxyl group is needed.

The presentation introduces the chromatogeny technology, reviews the developments made to go to full scale and then demonstrates, through selected results the potential of this new technology for the production of a new generation of papers such as silicone free recyclable release papers or high barrier papers at industrial scale. A focus will be on the relation between water uptake and surface energy which is directly linked to the grafting efficiency (amount of grafted fatty acids et free fatty acids). Indeed, the reaction can be tuned according to the operating conditions (reaction time, temperature, number of grafting passes).