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Research area: Product aims

Paper, paperboard and board // technical speciality papers

Key words:

Binder, Starch, Mottling, Surface analytical methods

TITLE:**Starch in the top coat – printability****Background/Problem area**

Binders in coating colors are used to connect pigments to themselves and to the base paper, so that the dissolution of the coating does not occur during the production and processing. Latex and starches are used as binders to control coating colour rheology, water retention and to modify paper stiffness and strength.

A still major obstacle to an increased dosage of starches as the (co-)binder in paper coatings is the reduction of surface non-uniformity (mottling). Mottling is an uneven, cloudy expression of a printing image on the paper surface. "Backtrap-mottling" appears in most printing processes, partially due to uneven penetration and back-splitting behavior of the printing ink on paper - especially on coated paper. Fogginess becomes visible. The printing colour penetrates unevenly in some cases due to an uneven distribution of the binder and pigments in the coating. 42% of all complaints for sheetfed papers are due to mottling according to a study published for sheet offset printing in 2006.

In this project, modified starch products will be developed as a co-binder for specific applications in the topcoat, which show a crucial lower tendency to mottle than traditional starch binder systems for paper coatings.

Objectives/Research results

There is a multitude of publications dealing with the migration of latex and starch binders and their influence on mottling. In addition to a detailed scientific study, surface analytical methods will be investigated for a baseline study of printing non-uniformity. One of the ambitions is to demonstrate the individual component distributions in the x-, y- and z-dimensions of the paper and the coated surface. The use of AFM and TOF-SIMS is intended to broaden knowledge on surface and cross-sectional studies. In addition, the use of Raman-spectroscopy is planned.

By understanding the interactions between modified starch and latex binders and their effect on mottling in greater detail, newly developed modified starches should be prepared and be evaluated further. The new derivatives produced will be characterized based on their compatibility with conventional coating color components. Suitable coating formulations will be scaled-up to pilot scale with the ultimate aim of industrial use.

In addition to the required mottling reducing properties, the influence on machine settings, coating colour rheology and drying velocities will be investigated as well.

Application/Economic benefits

The economic and technical applications also play a central role in this research project. Since starch is a renewable and natural raw material, a successful project will contribute to conserving finite fossil resources. Besides the advantages in the processability of the paper, the greater use of starch in paper coatings can potentially contribute to a better recyclability and promote the development of innovative starch products.

Its cost advantage compared to synthetic products can be passed on along the entire value chain beginning with starch manufacturers and ending with producers of paper and board materials and supplier industries.

Period of time: 01.07.2013-31.12.2015**Remarks**

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