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Research area: Product aims

Paper, paperboard and board // Technical specialty papers

Key words:

Pyroelectricity, catalysis, antimicrobial, oxidation, environmental technology, filters

TITLE:**Finishing paper with pyroelectric coatings****Background/Problem area**

Against a background of increasing environmental pollution as well as climate change and increasing depletion of resources, a rapidly growing global interest in green technologies has been observed in the past few years. The paper industry as well has been working on innovative developments aimed at offering environmentally friendly, sustainable, resource-efficient products for a wide variety of applications.

In the course of the research project, paper is to be finished with pyroelectric properties. In so doing, the charge exchange of the pyroelectric crystals with the environment is to be implemented in a selective and beneficial manner. The potential of the paper finished with this property to be employed in technical applications is to be examined and demonstrated.

Objectives/Research results

Important results are:

- Coating colors with pyroelectric pigments could be formulated, which are applicable using standard paper coating processes.
- In addition, these functional materials could be also successfully applied on paper using a novel method: by means of the flocking process.
- The coating colors have been investigated regarding their pyroelectric activity. For this purpose a special procedure using a fluorescent dye has been adopted to these materials.
- The pyroelectric activity of the used pigments is not affected by binders or other standard components of coating colors. Minor temperature changes (2 K) are already sufficient for the functionality.
- The proof of a distinct antimicrobial effect of coated papers was possible, as well as after application of the new method by flocking the pigments.
- The oxidative abilities of the pyroelectric pigments do not affect negatively the mechanical properties and stability of the papers and coatings before and after their defined ageing.

Application/Economic benefits

Conceivable applications include, inter alia, the sectors of air and effluent treatment, water treatment, filter systems and air conditioning systems, medical and microbiological working environments or even security features on packaging.

The utilization of pyroelectric substances in such technical applications is both resource-efficient and energy-savings. Creating charges on the crystal surfaces is a catalytic process which recurs with every temperature change, without consuming the substance itself. Energy savings is possible because no separate heat/cold source, current source, light source or radiation source is required. The required temperature changes can be produced by natural fluctuations as well as selectively exploiting induced heat/cold flows from other processes.

Period of time: 01.05.2013 – 30.04.2015

Remarks

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