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(54) **Ink-jet paper coating**

(57) A paper coating for ink-jet printing according the invention, comprising of sodium aluminosilicate, sodium chloride, polyvinyl alcohol, aliphatic polyamine and poly-aluminum chloride, of hydrophilic properties characteris-

es in that weight ratio of sodium chloride and polyaluminum chloride to aliphatic polyamine is 9.6 : 1. The coating is applied by a machine on a paper ground on one- or two-sides.

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## Description

**[0001]** The present invention relates to a paper coating for ink-jet printing.

**[0002]** Ink-jet printing, a technique pioneered during the second half of twentieth century, has created a need for paper of appropriate quality. During the last years of last century, special coatings designed for ink acceptance during printing were applied to improve print quality. The aim was achieved by hydrophilic coatings applied onto paper ground, using silica gel, polyvinyl alcohol and/or carboxymethylcellulose plus low molecular weight cationic polymer (e.g. modified polyethylenimine, polyvinylamine, condensation product of organic amides with formaldehyde, polyacrylamide) [Handbook of Paper and Board. Ed. H. Holik, WILEY-VCH Verlag GmbH & Co. KGaA, 2006, Weinheim, pp. 98-99]. Patent and specialist literature provide numerous versions of ink-jet paper coatings.

**[0003]** A paper ground for ink-jet printing with a cationic two-component surface coating is known from patent description US4,554,181. Cationic polymers applied in that invention characterises in that the cationic groups are available for anionic component of ink dye(s). The other source of cations are salts of a metal from group II, III or the Transition Metals of the Periodic Table of Elements of solubility greater than 5 g in 100 ml of water at 23°C Due to tend to colour the paper, salts of  $\text{Fe}^{2+}$ ,  $\text{Fe}^{3+}$  and  $\text{Cu}^{2+}$  are scarcely useful. It was revealed that salts of strong acids (including hydrochloric acid) are capable of insolubilising anionic ink components, but the anionic parts of the strong acids accelerate paper degradation.

**[0004]** A coating for ink-jet paper is known for Japanese patent application description JP 2001315433, which consists of 2-10 parts by weight of inorganic electrolyte (preferably sodium chloride), 0-100 parts by weight of porous absorbing material (e.g. silica particles), and up to 100 parts by weight hydrophilic or vinyl acetal resin. The mixture is to be prepared onto a polyethylene foil and then transferred onto a paper.

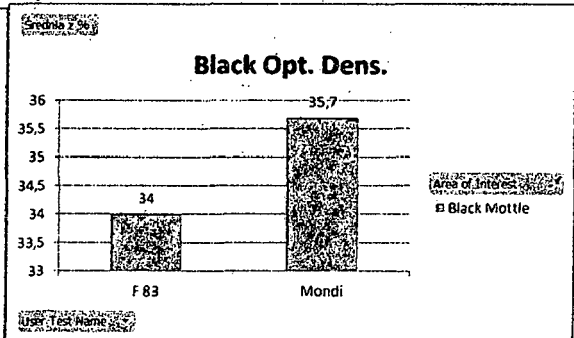
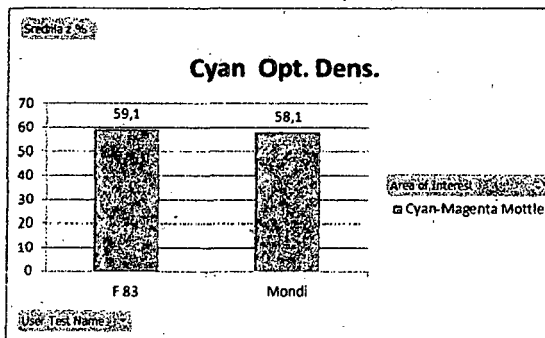
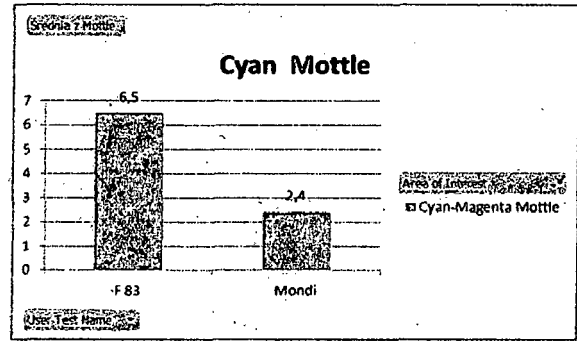
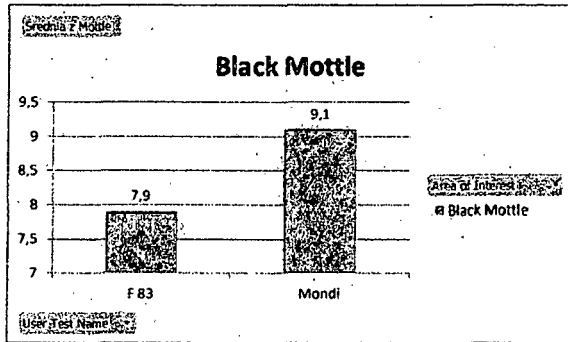
**[0005]** A paper coating for ink-jet printing according to the invention, comprising of sodium aluminosilicate, sodium chloride, polyvinyl alcohol, aliphatic polyamine and polyaluminum chloride, of hydrophilic properties characterises in that weight ratio of sodium chloride and polyaluminum chloride to aliphatic polyamine is 9.6 : 1. The coating is applied by a machine on a paper ground on one- or two-sides.

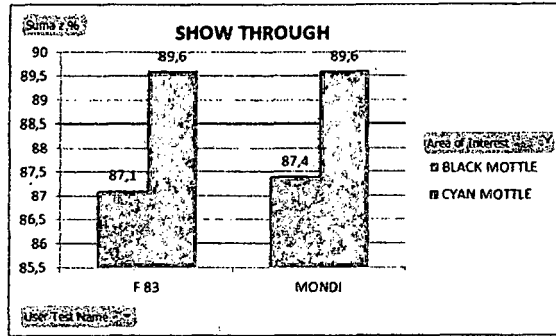
**[0006]** Unexpectedly, despite so high concentration of chlorides and sodium; a paper covered with the coating according to the invention is durable on one hand, and it provides good printing quality on the other hand. In addition, it is suitable for direct, mechanical applying on a paper with a standard machines. In laboratory tests on papers for ink-jet printing the following parameters were recorded: mottling, show-through, bleeding and optical density. Paper with the coating according to the invention was produced on a size press of a papermaking machine. Assessment of coatings consisted in evaluation of printouts using:

- a) industrial inks INK JET (OCE) and a piezoelectric head of an office printer (Epson Stylus),
- b) industrial printer Kodak Versmark,
- c) industrial printer OCE.

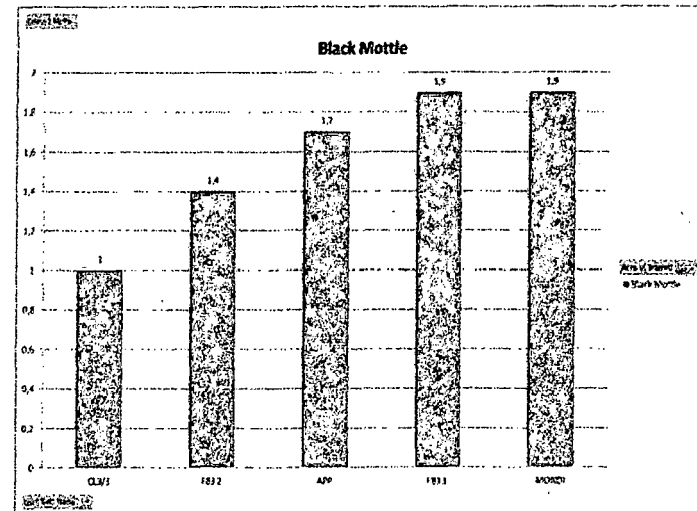
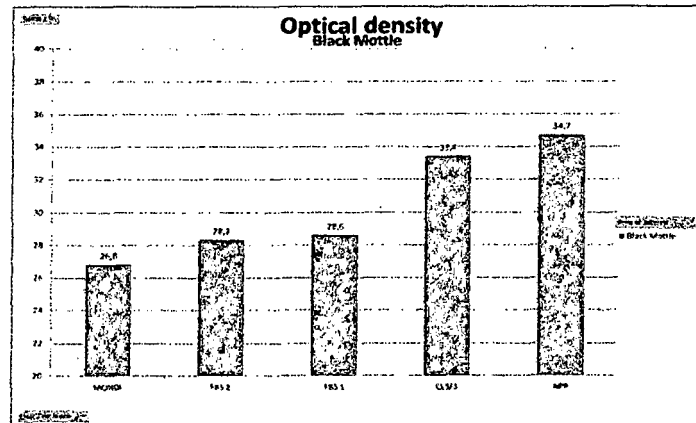
**[0007]** The results are presented in a table and charts (F 83 - paper with the coating according to the invention, APP - standard paper, Mondi - a reference paper for ink-jet printing, CL3 - other tested product):

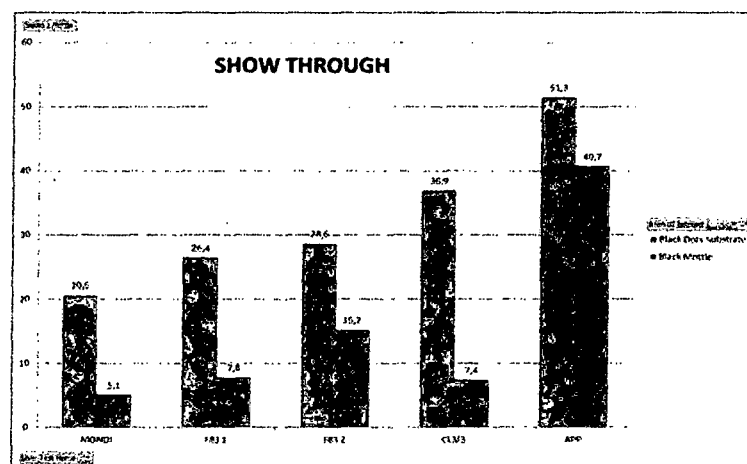
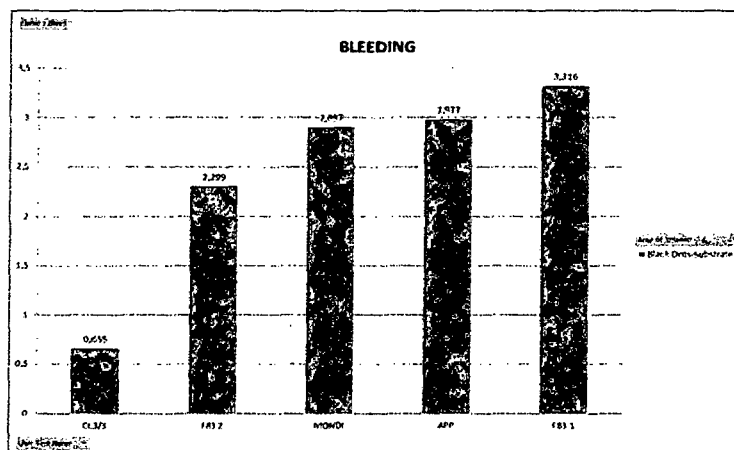
KODAK (software IA VERITY)





*Printouts with Epson Stylus (software IA VERITY)*





[0008] The results confirm a printing quality comparable with those of the reference paper for ink-jet printing. No accelerated degradation was found.

[0009] The invention is illustrated by the following exemplary embodiment.

[0010] Example. Water is to be poured into a mixer with a high-speed stirrer at amounts depending on demanded concentration of the coating mixture, and then the ingredients are added gradually at the indicated amounts:

| Ingredient             | Commercial name | Amount of a dry substance in g/100 g of the mixture | Weight percentage of all ingredients |
|------------------------|-----------------|-----------------------------------------------------|--------------------------------------|
| Sodium aluminosilicate | Zeocros PF      | 2                                                   | 16.49%                               |
| Sodium chloride        | evaporated salt | 6.25                                                | 51.54%                               |
| Polyvinyl alcohol      | PVOH BP-05      | 3                                                   | 24.74%                               |
| Aliphatic polyamine    | CATIOFAST 160   | 0.67                                                | 5.50%                                |
| Polyaluminum chloride  | PAX 18          | 0.21                                                | 1.73%                                |

[0011] Every ingredient shall be added as soon as a previous is completely dissolved in the mixture. A paper sheet is to be covered with the mixture with a papermaking machine or with a covering machine on one or two sides. Paper density of the produced paper is 70 - 160 g/m<sup>2</sup>, and coating density is 2-4 g/m<sup>2</sup>.

## Claims

1. A paper coating for ink-jet printing according the invention, comprising of sodium aluminosilicate, sodium chloride, polyvinyl alcohol, aliphatic polyamine and polyaluminum chloride, of hydrophilic properties characterises in that weight ratio of sodium chloride and polyaluminum chloride to aliphatic polyamine is 9.6 : 1

2. The paper coating according to the claim 1 characterises in that the mixture is applied by a machine on a paper ground on one- or two-sides.

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## EUROPEAN SEARCH REPORT

 Application Number  
 EP 14 46 0082

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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                             |                                                   |                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                               | Relevant to claim                                 | CLASSIFICATION OF THE APPLICATION (IPC)                             |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US 2009/297738 A1 (SONG JAY C [US] ET AL)<br>3 December 2009 (2009-12-03)<br>* paragraphs [0071], [0072]; claims *<br>----- | 1,2                                               | INV.<br>D21H19/06<br>B41M5/00<br>B41M5/52<br>D21H19/84<br>D21H21/16 |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                             |                                                   | D21H<br>B41M                                                        |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                             |                                                   |                                                                     |
| Place of search<br>Munich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                             | Date of completion of the search<br>13 March 2015 | Examiner<br>Koegler-Hoffmann, S                                     |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                             |                                                   |                                                                     |

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 14 46 0082

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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13-03-2015

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