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(54) Method for reducing negative effects of natural pitch contaminants in both pulping and papermaking operations

Verfahren zur Verringerung der negativen Auswirkungen von natürlichen Harzverunreinigungen bei der Zellstoff- und Papierherstellung

Procédé pour réduire les effets négatifs des contaminants naturels de pas dans des opérations de mise en pâte et de papier

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Description

[0001] The invention relates to resin and pitch control agents, which are aqueous, non-film forming, polymer dispersions and to a process for preventing the deposition of natural pitch particles in cellulosic pulp suspensions, by use of such polymer dispersions.

[0002] Cellulosic pulps contain a considerable proportion of organosoluble matter which is generally referred to as resin or pitch. The resins are extracted from the wood during the pulping process and constitute a significant nuisance in cellulosic suspensions because the resin particles are sticky, tend to agglomerate and form adherent deposits on the pulping and papermaking machinery. The removal of water during papermaking is normally carried out using a type of fabric mesh, commonly referred to as machine wires or felts. Resin or pitch deposits clog and block the small openings in the fabrics inhibiting drainage and causing sheet defects, such as holes in the finished paper. Deposits which accumulate on the internal surfaces of pulp and backwater chests can suddenly be released and displayed as resin lumps in the paper sheet. Larger lumps can break the paper sheet in the machine, leading to loss of production.

[0003] For years there have already been products supplied as passivating agents for treating pulp contaminants such as resin or pitch. These dissolved products are intended to make the surface of the tacky impurities more hydrophilic and hence keep them more wettable, thereby reducing the affinity for hydrophobic surfaces. Hydrophobic surfaces are present on, for example, wires, felts and rollers; hydrophobizing is boosted further by coating, with sizing agent or defoamer, for example, thereby further promoting the attachment of pitch.

[0004] In certain cases, resins and pitch do not cause any problems in papermaking, if they do not agglomerate. To prevent agglomeration, various methods are known for chemically modifying the pitch particles that have remained in the stock stream and the adsorption thereof on support materials, such as machine wires.

[0005] In the context of these problems, the procedures below have been adopted in practice, but lead only to partial success.

[0006] On the one hand, dispersion may take place, with the aim of changing the charge on the pitch by means of anionic and nonionic dispersants. This forms colloidal, anionically charged or nonionic particles which counteract agglomeration and deposition. The wetting properties of the dispersant are very important in this case, since the pitch is hydrophobic.

[0007] Alternatively, according to the literature, the tack of the pitch can be reduced in the following ways:

- Fixing of the strongly anionic contaminants by means of strongly cationic fixatives (formation of what are called polyelectrolyte complexes; the reaction product then adsorbs on the anionic fiber).

- Absorption on pigments of high specific surface area (e.g., talc, modified clay, mica, smectite, bentonite), often with subsequent flocculation by means of polymers in order to bind separable macroflocs.

- Enveloping (masking) with nonionic hydrophilic polymers (polyvinyl alcohol) or zirconium compounds, more particularly zirconium acetate and ammonium zirconium carbonate.

[0008] Known strongly cationic fixatives include polyethyleneimine (PEI), polydiallyldimethylammonium chloride (polyDADMAC), polyvinylamine (PVAm), polyaluminum chloride (PAC), polyacrylamide (PAAM), polyamine, etc. The sphere of action of fixatives extends from about 1 nm to 50 micrometers in terms of the particle size of the pitch, depending on the nature and modification of the chemicals used.

[0009] Materials with a low surface energy (wires, felts, roller surfaces) exhibit a more hydrophobic behaviour and therefore possess a high affinity for hydrophobic compounds, such as resins and pitch, thereby resulting in contamination of the wires compounds, such as resins and pitch, thereby resulting in contamination of the wires and hence to defects and/or reduction in the dewatering performance of felts.

[0010] Adsorbents used are, in particular, various types of talc with specific surface modifications and particle-size distribution, which on account of their hydrophobic and organophilic surface are capable of attaching to adhesive constituents and entraining them with the paper. Particles of adhesive encapsulated in this way have less of a tendency to deposit on hot machinery parts.

[0011] Protein solutions are also employed as agents for masking sticky impurities.

[0012] The pitch agglomerates tend to deposit on machinery parts, wires, cloths, drying cylinders, and this consequently leads to marks, holes, and instances of web sticking, and consequently to breakages in the wet section and drying section in the course of winding and rewinding or in the course of printing.

[0013] DE-102009035884.6 / EP 2 462 278 corresponding to WO 2011/015297 by Clariant discloses a method for reducing negative effects of adhesive synthetic contaminants in systems of substances comprising waste paper. In waste paper the main problem are the pitch agglomerates (stickies) which lead to a deposit on the machinery parts.

[0014] In contrary in the process for producing cellulosic pulp suspensions the negative effects are caused by natural pitch contaminants in both pulping and papermaking operations. These contaminants tend to deposit during the production on the cellulosic material and lead to ugly black spots.

[0015] In order to prevent resin deposits talc has been known in the prior art to prevent and control pitch deposits. Using talc to control pitch deposits, however, has cer-

tain disadvantages. For instance, the system is highly sensitive to shear. Talc, moreover, has poor retention properties and frequently causes clogging of the felts. Talc may adversely affect resin sizing, and stabilizes foam. The two inorganic products, talc and bentonite, require laborious dispersion.

[0016] Surprisingly, the tackiness of pitch can be reduced considerably through the use of specific polymer dispersions.

[0017] The invention provides the use of an aqueous polymer dispersion in a method for reducing sticky natural pitch contaminants in the processing of wood pulp and in the papermaking procedure, which involves adding an aqueous polymer dispersion comprising a component A and a component B for passivating and detackifying the natural pitch particles, component A being a homopolymer and/or copolymer of acrylic acid and/or its alkyl esters, more particularly its methyl, ethyl, butyl, isobutyl, propyl, octyl, decyl, 2-ethylhexyl esters; or methacrylic acid and/or its alkyl esters, more particularly its methyl, ethyl, butyl, isobutyl, propyl, octyl, decyl, 2-ethylhexyl esters;

styrene and/or methylstyrene;

vinyl acetate;

itaconic acid;

glycidyl methacrylate;

2-hydroxyalkyl (meth)acrylate;

methacrylamide;

N-hydroxyethyl (meth)acrylamide

dimethacrylate monomers, such as, for example, 1,4-butylene glycol dimethacrylate, 1,3-butylene glycol dimethacrylate, ethylene glycol dimethacrylate, diethylene glycol dimethacrylate, propylene glycol dimethacrylate, dipropylene glycol dimethacrylate, 4-methyl-1,4-pentanediol dimethacrylate;

divinylbenzene and/or trivinylbenzene

and component B being an aqueous solution of a styrene copolymer with acrylic acid, maleimide and/or maleic anhydride.

[0018] Component A is a hydrophobic homopolymer and/or copolymer of the above-stated monomers having a very high glass transition temperature or softening temperature (T_g), preferably methyl methacrylate or styrene. The glass transition temperature of A is preferably above 70 °C, more particularly above 90 °C, very preferably above 100 °C.

[0019] Component B is a styrene copolymer with (meth)acrylic acid, maleimide and/or maleic anhydride. Component B is preferably a copolymer of styrene and acrylic acid. Component B preferably has a molecular weight of between 3000 g/mol and 15 000 g/mol, more particularly 3000 and 7000 g/mol.

[0020] Particularly preferred is the use of an aqueous dispersion with particle sizes of less than 150 nm, preferably less than 120 nm.

[0021] The aqueous polymer dispersion may be applied in combination with calcium and/or magnesium salts, often naturally occurring in the processing water.

Hardness salts insolubilise component B, leading to the de-stabilisation of the tiny emulsion particles. The agglomerated emulsion particles are now more hydrophobic and associate readily and preferentially with any pitch particles in the pulp. The harder emulsion particles reduce the tackiness of the pitch and increase the softening temperature. Hard agglomerates show much less tendency to deposit on machinery.

[0022] Where water hardness levels are very low, there may not be sufficient electrolyte to initiate de-stabilisation of the emulsion particles. The aqueous polymer dispersion may therefore be optionally applied in combination with component C, a cationic fixative, which promotes coagulation of the emulsion particles in the cellulosic fibre slurry. Component C is preferably selected from the following group:

polyethyleneimine (PEI), polydiallyldimethylammonium chloride (polyDADMAC),

polyvinylamine (PVAm), polyaluminum chloride (PAC), zirconium salts, polyacrylamide (PAAM), polyamine and polyamideamine.

[0023] In order to boost the efficiency of the polymer dispersion of the invention and its stability, it is further possible to add a further component D optionally in the form of a surfactant.

[0024] Further to components A, B, and/or D, the polymer dispersion comprises water (component E).

[0025] In one preferred embodiment the aqueous dispersion comprises 2 % to 50 %, preferably 5 % to 30 % of component A, 1 % to 30 %, preferably 3 % to 10 % of component B, 0 % to 0.3 %, preferably 0 % to 0.2 % of component D, and 96 % to 17.7 %, preferably 90 % to 45 % of water (component E).

[0026] All percentages here relate to % by weight.

[0027] In the presence of Ca^{2+} , the aqueous dispersion constitutes a self-coagulating nanodispersion. The polymer dispersion of the invention attaches to the hydrophobic sticky particles, incorporating them into the precipitating polymer dispersion and thus detackifying them.

Examples:

Example 1 (version with methyl methacrylate)

[0028] A 2 l reactor with stirrer and reflux condenser was charged with 739.5 g of deionized water and 419.3 g of 25 % strength solution of styrene-acrylic acid copolymer, this initial charge then being heated to 85 °C with stirring under a nitrogen atmosphere.

Feed stream I:

[0029] 384.8 g of methyl methacrylate

Feed stream II:

[0030] 1.9 g of ammonium peroxodisulfate
136.3 g of deionized water

[0031] When an internal temperature of 85 °C had been reached, feed stream I and feed stream II were metered continuously into the polymerization batch via two separate feeds, beginning simultaneously, over a period of 3 h 30, with stirring and retention of the reaction temperature. The pumps were flushed with 318.2 g of deionized water. After the end of both feed streams, the system was left to after react at the reaction temperature for a further 25 minutes. After that, the reaction mixture was cooled to room temperature and filtered on a filter having a mesh size of 160 µm.

[0032] The characterization of the copolymer obtained, in terms of solids content (SC) and average particle size (D), is given below:

SC = 24.1 %
D = 53 nm

Example 2 (version with methyl methacrylate + crosslinker)

[0033] A 2 l reactor with stirrer and reflux condenser was charged with 739.5 g of deionized water and 419.3 g of 25 % strength solution of styrene-acrylic acid copolymer, this initial charge then being heated to 85 °C with stirring under a nitrogen atmosphere.

Feed stream I:

[0034] 370.9 g of methyl methacrylate
19.5 g of glycidyl methacrylate

Feed stream II:

[0035] 1.9 g of ammonium peroxodisulfate
136.3 g of deionized water

[0036] When an internal temperature of 85 °C had been reached, feed stream I and feed stream II were metered continuously into the polymerization batch via two separate feeds, beginning simultaneously, over a period of 3 h 30, with stirring and retention of the reaction temperature. The pumps were flushed with 318.2 g of deionized water. After the end of both feed streams, the system was left to after react at the reaction temperature for a further 25 minutes. After that, the reaction mixture was cooled to room temperature and filtered on a filter having a mesh size of 160 µm.

[0037] The characterization of the copolymer obtained, in terms of solids content (SC) and average particle size (D), is given below:

SC = 24.9 %
D = 40 nm

Example 3 (version with methyl methacrylate + second crosslinker)

[0038] A 2 l reactor with stirrer and reflux condenser was charged with 740 g of deionized water and 419 g of 25 % strength solution of styrene-acrylic acid copolymer, this initial charge then being heated to 85 °C with stirring under a nitrogen atmosphere.

Feed stream I:

[0039] 370 g of methyl methacrylate
19 g of ethylene glycol dimethacrylate

Feed stream II:

[0040] 2 g of ammonium peroxodisulfate
136 g of deionized water

[0041] When an internal temperature of 85 °C had been reached, feed stream I and feed stream II were metered continuously into the polymerization batch via two separate feeds, beginning simultaneously, over a period of 3 h 30, with stirring and retention of the reaction temperature. The pumps were flushed with 318 g of deionized water. After the end of both feed streams, the system was left to after react at the reaction temperature for a further 25 minutes. After that, the reaction mixture was cooled to room temperature and filtered on a filter having a mesh size of 160 µm.

[0042] The characterization of the copolymer obtained, in terms of solids content (SC) and average particle size (D), is given below:

SC = 25 %
D = 40 nm

Example 4 (version with styrene)

[0043] A 2 l reactor with stirrer and reflux condenser was charged with 739.5 g of deionized water and 419.3 g of 25 % strength solution of styrene-acrylic acid copolymer, this initial charge then being heated to 85 °C with stirring under a nitrogen atmosphere.

Feed stream I:

[0044] 384.8 g of styrene

Feed stream II:

[0045] 1.9 g of ammonium peroxodisulfate
136.3 g of deionized water

[0046] When an internal temperature of 85 °C had been reached, feed stream I and feed stream II were metered continuously into the polymerization batch via two separate feeds, beginning simultaneously, over a period of 3 h 30, with stirring and retention of the reaction temperature. The pumps were flushed with 318.2 g of

deionized water. After the end of both feed streams, the system was left to after react at the reaction temperature for a further 25 minutes. After that, the reaction mixture was cooled to room temperature and filtered on a filter having a mesh size of 160 μm .

[0047] The characterization of the copolymer obtained, in terms of solids content (SC) and average particle size (D), is given below:

$$\text{SC} = 24.5 \%$$

$$D = 61 \text{ nm}$$

Example 5 (version with colloid + surfactant)

[0048] A 2 l reactor with stirrer and reflux condenser was charged with 1111 g of deionized water, 310 g of 25 % strength solution of styrene-acrylic acid copolymer, and 3 grams of lauryl sulfate, this initial charge then being heated to 85 °C with stirring under a nitrogen atmosphere.

Feed stream I:

[0049] 387 g of methyl methacrylate

Feed stream II:

[0050] 2 g of ammonium peroxodisulfate
88 g of deionized water

[0051] When an internal temperature of 85 °C had been reached, feed stream I and feed stream II were metered continuously into the polymerization batch via two separate feeds, beginning simultaneously, over a period of 3 h 30, with stirring and retention of the reaction temperature. The pumps were flushed with 80 g of deionized water. After the end of both feed streams, the system was left to after react at the reaction temperature for a further 25 minutes. After that, the reaction mixture was cooled to room temperature and filtered on a filter having a mesh size of 160 μm .

[0052] The characterization of the copolymer obtained, in terms of solids content (SC) and average particle size (D), is given below:

$$\text{SC} = 24 \%$$

$$D = 50 \text{ nm}$$

Example 6 (styrene-methyl acrylate copolymer)

[0053] A 2 l reactor with stirrer and reflux condenser was charged with 739.5 g of deionized water and 420 g of 25 % strength solution of styrene-acrylic acid copolymer, this initial charge then being heated to 85 °C with stirring under a nitrogen atmosphere.

Feed stream I:

[0054] 193 g of styrene

193 g of methyl methacrylate

Feed stream II:

5 [0055] 2 g of ammonium peroxodisulfate
136 g of deionized water

[0056] When an internal temperature of 85 °C had been reached, feed stream I and feed stream II were metered continuously into the polymerization batch via two separate feeds, beginning simultaneously, over a period of 3 h 30, with stirring and retention of the reaction temperature. The pumps were flushed with 318.2 g of deionized water. After the end of both feed streams, the system was left to after react at the reaction temperature for a further 25 minutes. After that, the reaction mixture was cooled to room temperature and filtered on a filter having a mesh size of 160 μm .

[0057] The characterization of the copolymer obtained, in terms of solids content (SC) and average particle size (D), is given below:

$$\text{SC} = 30.0 \%$$

$$D = 70 \text{ nm}$$

25 Example 7 (styrene-maleic anhydride as component B)

[0058] A 2 l reactor with stirrer and reflux condenser was charged with 400 g of deionized water and 750 g of 14 % strength solution of styrene-maleic anhydride copolymer, this initial charge then being heated to 85 °C with stirring under a nitrogen atmosphere.

Feed stream I:

35 [0059] 390 g of methyl methacrylate

Feed stream II:

[0060] 2 g of ammonium peroxodisulfate
40 130 g of deionized water

[0061] When an internal temperature of 85 °C had been reached, feed stream I and feed stream II were metered continuously into the polymerization batch via two separate feeds, beginning simultaneously, over a period of 3 h 30, with stirring and retention of the reaction temperature. The pumps were flushed with 318.2 g of deionized water. After that, the reaction mixture was cooled to room temperature and filtered on a filter having a mesh size of 160 μm .

[0062] The characterization of the copolymer obtained, in terms of solids content (SC) and average particle size (D), is given below:

$$\text{SC} = 29.6 \%$$

$$55 D = 70 \text{ nm}$$

Example 8 (high colloid fraction)

[0063] A 2 l reactor with stirrer and reflux condenser was charged with 21.1 g of deionized water and 750 g of 25 % strength solution of styrene-acrylic acid copolymer, this initial charge then being heated to 85 °C with stirring under a nitrogen atmosphere.

Feed stream I:

[0064] 390 g of methyl methacrylate

Feed stream II:

[0065] 2 g of ammonium peroxodisulfate
130 g of deionized water

[0066] When an internal temperature of 85 °C had been reached, feed stream I and feed stream II were metered continuously into the polymerization batch via two separate feeds, beginning simultaneously, over a period of 3 h 30, with stirring and retention of the reaction temperature. The pumps were flushed with 80 g of deionized water. After the end of both feed streams, the mixture was left to after react at the reaction temperature for a further 25 minutes. After that, the reaction mixture was cooled to room temperature and filtered on a filter having a mesh size of 160 µm.

[0067] The characterization of the copolymer obtained, in terms of solids content (SC) and average particle size (D), is given below:

SC = 44 %
D = 80 nm

Example 9 (styrene-acrylic acid copolymer with Tg of about 30 °C)

[0068] A 2 l reactor with stirrer and reflux condenser was charged with 433 g of deionized water, and 3 grams of lauryl sulfate (30 % strength solution), this initial charge then being heated to 80 °C with stirring under a nitrogen atmosphere.

Feed stream I:

[0069] 5 g of ammonium peroxodisulfate
62 g of deionized water

Feed stream II:

[0070] 400 g of styrene,
260 g of butyl acrylate,
10 g of methacrylic acid,
11 g of surfactant solution (lauryl sulfate, 30 %),
384 g of deionized water

[0071] When an internal temperature of 80 °C had been reached, feed stream I and feed stream II were metered continuously into the polymerization batch via

two separate feeds, beginning simultaneously, over a period of 4 h, with stirring and retention of the reaction temperature. The pumps were flushed with 235 g of deionized water. After the end of both feed streams, the system was left to after react at the reaction temperature for a further 25 minutes. After that, the reaction mixture was cooled to room temperature and filtered on a filter having a mesh size of 160 µm.

[0072] The characterization of the copolymer obtained, in terms of solids content (SC) and average particle size (D), is given below:

SC = 37%
D = 185 nm
Tg = 30 °C

Claims

1. A method for inhibiting natural pitch deposition on pulping and papermaking equipment or machinery in the processing of wood pulp comprising adding to a wood pulp slurry containing natural pitch an effective amount of polymer dispersion comprising a component A and a component B, wherein component A being a homopolymer and/or copolymer of acrylic acid and/or its alkyl esters, or methacrylic acid and/or its alkyl esters, styrene and/or methylstyrene, vinyl acetate, itaconic acid, glycidyl methacrylate, 2-hydroxyalkyl (meth)acrylate, methacrylamide, N-hydroxyethyl(meth)acrylamide, dimethacrylate monomers, 1,3-butylene glycol dimethacrylate, ethylene glycol dimethacrylate, diethylene glycol dimethacrylate, propylene glycol dimethacrylate, dipropylene glycol dimethacrylate, 4-methyl-1,4-pentanediol dimethacrylate, divinylbenzene and/or trivinylbenzene, and component B being an aqueous solution of a styrene copolymer with acrylic acid, maleimide and/or maleic anhydride.
2. The method as claimed in claim 1, wherein component A possesses a glass transition temperature > 90 °C.
3. The method as claimed in at least one of the preceding claims, wherein component B possesses a molecular weight in the range from 3000 to 15000 g/mol, preferably 3000 to 7000 g/mol.
4. The method as claimed in at least one of the preceding claims, wherein the aqueous polymer dispersion is applied in combination with calcium and or magnesium salts, or component C, a cationic fixative, any of which promote the coagulation of the aqueous emulsion particles.
5. The method as claimed in any of the preceding claims, wherein the aqueous polymer dispersion is

pre-mixed with calcium and or magnesium salts or Component C, before adding the components to the fibrous slurry, during pulp or paper manufacture.

6. The method as claimed in claim 4 or 5, wherein component C is selected from the following group: polyethyleneimine (PEI), polydiallyldimethylammonium chloride (polyDADMAC), polyvinylamine (PVAm), polyaluminum chloride (PAC), zirconium salts, polyacrylamide (PAAM), polyamine and polyamideamine. 5
7. The method as claimed in at least one of the preceding claims, wherein the aqueous polymer dispersion further comprises a component D in the form of a surfactant. 10
8. The use of an aqueous polymer dispersion comprising a component A and a component B as defined in any of claims 1 to 4 for coagulating and detackifying natural pitch particles in the processing of wood pulp. 15
9. The use of an aqueous polymer dispersion comprising a component A and a component B, component A being a homopolymer and/or copolymer of methyl methacrylate, acrylate and/or styrene and component B being an aqueous solution of styrene copolymer with acrylic acid, maleimide and/or maleic anhydride, for coagulating and detackifying natural pitch particles in the processing of wood pulp. 20
10. The use as claimed in claim 8 or 9, wherein the polymer dispersion is further combined with calcium and/or magnesium salts or the natural water hardness in the pulp and/or papermaking process water or component C, a cationic fixative, in particular when the waterhardness is below 15-20 °dH. 25
11. The use as claimed in claim 8 or 9, wherein the amount of aqueous dispersion applied to the cellulosic pulp slurry is 0.05 to 0.5 %, e.g. 0.1 to 0.2 %, based on the dry weight of the cellulose. 30

Patentansprüche

1. Methode zur Vermeidung von Ablagerungen natürlicher Harze während der Holzzellstoffverarbeitung auf Geräten und Anlagen der Zellstoff- und Papierherstellung, aufweisend die Zugabe einer wirksamen Menge einer Polymerdispersion zu einem Holzzellstoffbrei, der natürliche Harze enthält, wobei die Polymerdispersion eine Komponente A und eine Komponente B aufweist, wobei die Komponente A ein Homopolymer und/oder Copolymer von Acrylsäure und/oder deren Alkylester, oder Methacrylsäure und/oder deren Alkylester, Styrol und/oder 50

Methylstyrol, Vinylacetat, Itaconsäure, Glycidylmethacrylat, 2-Hydroxy(meth)acrylate, Methacrylamide, N-Hydroxyethylmethacrylamid, Dimethacrylatmonomere, 1,3-Butylenglykoldimethacrylat, Ethylenglykoldimethacrylat, Diethylenglykoldimethacrylat, Propylenglykoldimethacrylat, Dipropylenglykoldimethacrylat, 4-Methyl-1,4-pentandiolmethacrylat, Divinylbenzol und/oder Trivinylbenzol ist, und Komponente B eine wässrige Lösung eines Copolymers aus Styrol mit Acrylsäure, Maleinimid und/oder Maleinsäureanhydrid ist.

2. Methode nach Anspruch 1, wobei Komponente A eine Glasübergangstemperatur von >90°C hat. 15
3. Methode nach mindestens einem der vorhergehenden Ansprüche, wobei Komponente B ein Molekulargewicht im Bereich von 3000 bis 15000 g/mol, vorzugsweise 3000 bis 7000 g/mol aufweist. 20
4. Methode nach mindestens einem der vorhergehenden Ansprüche, wobei die wässrige Polymerdispersion in Kombination mit Calcium oder Magnesiumsalzen, oder einer Komponente C, welches ein kationisches Fixiermittel ist, angewendet wird, wobei die Calcium oder Magnesiumsalze oder die Komponente C jeweils die Koagulation der wässrigen Emulsionspartikel fördern. 25
5. Methode nach mindestens einem der vorhergehenden Ansprüche, wobei die wässrige Polymerdispersion mit Calcium- und/oder Magnesiumsalzen oder Komponente C vorgemischt wird, bevor die Komponenten zu dem faserigen Brei während der Zellstoff- oder Papierherstellung gegeben werden. 30
6. Methode nach Anspruch 4 oder 5, wobei Komponente C aus der folgenden Gruppe ausgewählt ist: Polyethylenimin (PEI), Polydiallyldimethylammoniumchlorid (polyDADMAC), Polyvinylamin (PVAm), Polyaluminiumchlorid (PAC), Zirkoniumsalze, Polyacrylamid (PAAM), Polyamine und Polyamidamin. 35
7. Methode nach mindestens einem der vorhergehenden Ansprüche, wobei die wässrige Polymerdispersion weiter eine Komponente D in Form eines Tensids aufweist. 40
8. Verwendung einer wässrigen Polymerdispersion aufweisend eine Komponente A und eine Komponente B zur Koagulation und Entklebung von natürlichen Harzpartikeln in der Verarbeitung von Holzzellstoff, wobei Komponente A und Komponente B gemäß einem der Ansprüche 1 bis 4 definiert sind. 45
9. Verwendung einer wässrigen Polymerdispersion aufweisend eine Komponente A und eine Komponente B für die Koagulation und Entklebung von na-

türlichen Harzpartikeln in der Verarbeitung von Holz-
zellstoff, wobei Komponente A ein Homopolymer
und/ oder ein Copolymer von Methylmethacrylat,
Acrylat, und/ oder Styrol ist und Komponente B eine
wässrige Lösung eines Copolymers aus Styrol mit
Acrylsäure, Maleinimid und/ oder Maleinsäureanhy-
drid ist.

10. Verwendung nach Anspruch 8 oder 9, wobei die Po-
lymerdispersion weiter mit Calcium- und/ oder Ma-
gnesiumsalzen oder der natürlichen Härte des Was-
sers, welches bei der Zellstoff- und/oder Papierher-
stellung verwendet wird, oder der Komponente C,
welches ein kationisches Fixiermittel ist, kombiniert
wird insbesondere dann, wenn die Wasserhärte in
der Zellstoff- oder Papierherstellung unterhalb von
15- 20° dH liegt.

11. Verwendung nach Anspruch 8 oder 9, wobei die
Menge der wässrigen Dispersion, die der zellulose-
haltige Zellstoff-Aufschlammung zugegeben wird
0,05 bis 0,5%, zum Beispiel 0,1 bis 0,2%, bezogen
auf das Trockengewicht der Zellulose beträgt.

Revendications

1. Procédé d'inhibition des dépôts de poix naturelle sur
le matériel ou les machines de mise en pâte et de
fabrication de papier dans le traitement de la pâte
de bois comprenant l'addition à une pâte liquide de
bois contenant de la poix naturelle d'une quantité
efficace de dispersion de polymère comprenant un
composant A et un composant B, dans lequel le com-
posant A est un homopolymère et/ou un copolymère
d'acide acrylique et/ou de ses esters alkyliques, ou
d'acide méthacrylique et/ou de ses esters alkyliques,
de styrène et/ou de méthylstyrène, d'acétate de vi-
nyle, d'acide itaconique, de méthacrylate de glyci-
dyle, de (méth)acrylate de 2-hydroxyalkyle, de mé-
thacrylamide, de N-hydroxyéthyl(méth)acrylamide,
de monomères de diméthacrylate, de diméthacryla-
te de 1,3-butylène glycol, de diméthacrylate d'éthy-
lène glycol, de diméthacrylate de diéthylène glycol,
de diméthacrylate de propylène glycol, de diméthac-
rylate de dipropylène glycol, de diméthacrylate de
4-méthyl-1,4-pentandiol, de divinylbenzène et/ou
de trivinylbenzène, et le composant B est une solu-
tion aqueuse d'un copolymère de styrène avec de
l'acide acrylique, du maléimide et/ou de l'anhydride
maléique.
2. Procédé selon la revendication 1, dans lequel le
composant A possède une température de transition
vitreuse > 90 °C.
3. Procédé selon au moins l'une des revendications
précédentes, dans lequel le composant B possède

un poids moléculaire dans la plage de 3 000 à 15
000 g/mol, de préférence de 3 000 à 7 000 g/mol.

4. Procédé selon au moins l'une des revendications
précédentes, dans lequel la dispersion aqueuse de
polymère est appliquée en combinaison avec des
sels de calcium et/ou de magnésium, ou un compo-
sant C, un fixateur cationique, l'un quelconque de
ces composés favorisant la coagulation des particu-
les en émulsion aqueuse.
5. Procédé selon l'une quelconque des revendications
précédentes, dans lequel la dispersion aqueuse de
polymère est pré-mélangée avec des sels de cal-
cium et/ou de magnésium ou le composant C, avant
l'addition des composants au liquide chargé fibreux,
au cours de la fabrication de pâte et de papier.
6. Procédé selon la revendication 4 ou 5, dans lequel
le composant C est choisi dans le groupe suivant :
polyéthylèneimine (PEI), chlorure de polydiallyldi-
méthylammonium (polyDADMAC), polyvinylamine
(PVAm), chlorure de polyaluminium (PAC), sels de
zirconium, polyacrylamide (PAAM), polyamine et po-
lyamideamine.
7. Procédé selon au moins l'une des revendications
précédentes, dans lequel la dispersion aqueuse de
polymère comprend en outre un composant D sous
la forme d'un tensioactif.
8. Utilisation d'une dispersion aqueuse de polymère
comprenant un composant A et un composant B se-
lon l'une quelconque des revendications 1 à 4 pour
la coagulation et la suppression de la tendance au
collant des particules de poix naturelle dans le trai-
tement de la pâte de bois.
9. Utilisation d'une dispersion aqueuse de polymère
comprenant un composant A et un composant B, le
composant A étant un homopolymère et/ou un co-
polymère de méthacrylate de méthyle, d'acrylate
et/ou de styrène et le composant B étant une solution
aqueuse de copolymère de styrène avec de l'acide
acrylique, du maléimide et/ou de l'anhydride maléi-
que, pour la coagulation et la suppression de la ten-
dence au collant des particules de poix naturelle
dans le traitement de la pâte de bois.
10. Utilisation selon la revendication 8 ou 9, dans laquel-
le la dispersion de polymère est en outre combinée
avec des sels de calcium et/ou de magnésium ou la
dureté de l'eau naturelle du procédé de mise en pâte
et/ou de fabrication de papier ou le composant C, un
fixateur cationique, en particulier lorsque la dureté
de l'eau est inférieure à 15-20 °dH.
11. Utilisation selon la revendication 8 ou 9, dans laquel-

le la quantité de dispersion aqueuse appliquée à la
pâte liquide cellulosique est de 0,05 à 0,5 %, par
exemple de 0,1 à 0,2 %, sur la base du poids sec de
la cellulose.

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REFERENCES CITED IN THE DESCRIPTION

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