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(54) VISCOSE RAYON NON-WOVEN FABRIC TREATMENT AGENT, AQUEOUS SOLUTION OF VISCOSE RAYON NON-WOVEN FABRIC TREATMENT AGENT, VISCOSE RAYON, AND METHOD FOR MANUFACTURING VISCOSE RAYON FOR NON-WOVEN FABRICS

(57) A viscose rayon non-woven fabric treatment agent according to the present invention is characterized by comprising a zinc compound and a surfactant. An aqueous solution of a viscose rayon non-woven fabric treatment agent according to the present invention is characterized by comprising a surfactant-containing viscose rayon treatment agent, a zinc compound and water.

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Description

TECHNICAL FIELD

[0001] The present invention relates to a viscose rayon nonwoven fabric treatment agent, a viscose rayon to which the treatment agent is adhered, an aqueous liquid of viscose rayon nonwoven fabric treatment agent, a viscose rayon to which the aqueous liquid is adhered, and a method for manufacturing a viscose rayon for a nonwoven fabric.

BACKGROUND ART

[0002] Generally, as raw material fibers used in nonwoven fabrics, natural fibers, such as cotton fiber, regenerated fibers, such as rayon, and synthetic fibers, such as polyolefin, are used.

[0003] A treatment of adhering a nonwoven fabric treatment agent that contains a surfactant to the surface of a raw material fiber is performed at times to impart the raw material fiber with various characteristics such as lubricity and bundling property that are deemed necessary for manufacturing a nonwoven fabric.

[0004] Conventionally, Patent Documents 1 and 2 disclose known treatment agents that are applied to raw material fibers of viscose rayon nonwoven fabrics. The treatment agent of Patent Documents 1 and 2 contain a mineral oil, a fatty acid ester, and a polyoxyalkylene polyhydric alcohol fatty acid ester.

PRIOR ART LITERATURE

PATENT LITERATURE

[0005]

Patent Document 1: International Publication No. WO 2016/104106
Patent Document 2: Japanese Laid-Open Patent Publication No. 2014-240530

SUMMARY OF THE INVENTION

PROBLEMS THAT THE INVENTION IS TO SOLVE

[0006] However, due to containing surfactants, the conventional viscose rayon nonwoven fabric treatment agents have a problem of foaming during use or preparation of an aqueous liquid and especially foaming readily in a step of adhering the aqueous liquid to viscose rayon. On the other hand, if the content of surfactants is decreased, there is a problem in that the aqueous liquid decreases in emulsion stability and thus the aqueous liquid degrades readily in appearance.

[0007] The present invention has been made in view of such circumstances and an object thereof is to provide a viscose rayon nonwoven fabric treatment agent by which a prepared aqueous liquid can be improved in appearance and foaming can be reduced. Also, an object is to provide an aqueous liquid of viscose rayon nonwoven fabric treatment agent by which appearance can be improved and foaming can be reduced. Also, an object is to provide a viscose rayon with which the viscose rayon nonwoven fabric treatment agent or the aqueous liquid of viscose rayon nonwoven fabric treatment agent is adhered. Also, an object is to provide a method for manufacturing a viscose rayon for a nonwoven fabric by using the viscose rayon nonwoven fabric treatment agent or the aqueous liquid of viscose rayon nonwoven fabric treatment agent is adhered.

MEANS FOR SOLVING THE PROBLEMS

[0008] As a result of performing research toward solving the above problem, the inventors of the present invention found that a treatment agent with which a zinc compound is contained in a viscose rayon nonwoven fabric treatment agent that contains a surfactant is truly favorable.

[0009] A viscose rayon (excluding a deodorant regenerated cellulose fiber with which a carboxylic-group-containing polymer is contained in the cellulose fiber) nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) for solving the above problem is characterized by containing a zinc compound and a surfactant.

[0010] A viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) for solving the above problem is characterized by containing a zinc compound, a surfactant, at least one selected from among fatty acids with 12 to 24 carbon atoms and

the following oils and fats, and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule.

[0011] Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

[0012] A viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) for solving the above problem is characterized by containing a zinc compound, a surfactant, and at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

[0013] The viscose rayon nonwoven fabric treatment agent is preferably one with which the surfactant includes at least one selected from among anionic surfactants and nonionic surfactants.

[0014] A viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) for solving the above problem is characterized by containing a zinc compound and at least an anionic surfactant as a surfactant.

[0015] The viscose rayon nonwoven fabric treatment agent preferably further contains a nonionic surfactant.

[0016] Preferably with the viscose rayon nonwoven fabric treatment agent, the surfactant includes the nonionic surfactant and the nonionic surfactant includes at least one fatty acid derivative selected from among compounds with which an alkylene oxide with 2 to 4 carbon atoms is added at a ratio of 0.1 to 30 moles with respect to 1 mole of a fatty acid with 12 to 24 carbon atoms and ester compounds of 12 to 24 carbon atom fatty acid polyethylene glycols.

[0017] Preferably with the viscose rayon nonwoven fabric treatment agent, if the total content of the zinc compound and the surfactant is taken as 100% by mass, the zinc compound is contained at a ratio of 0.001 % to 5% by mass.

[0018] The viscose rayon nonwoven fabric treatment agent preferably further contains at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule. The oils and fats are at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

[0019] The viscose rayon nonwoven fabric treatment agent preferably further contains at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

[0020] Preferably with the viscose rayon nonwoven fabric treatment agent, the zinc compound is contained in the treatment agent at a ratio of 0.001% to 1% by mass.

[0021] A viscose rayon for solving the above problem is characterized in that the viscose rayon nonwoven fabric treatment agent is adhered thereto.

[0022] An aqueous liquid of viscose rayon (excluding a deodorant regenerated cellulose fiber with which a carboxylic-group-containing polymer is contained in the cellulose fiber) nonwoven fabric treatment agent (excluding a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) for solving the above problem is characterized by containing a viscose rayon nonwoven fabric treatment agent that contains a surfactant and containing a zinc compound and water.

[0023] An aqueous liquid of viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) for solving the above problem is characterized by containing a viscose rayon nonwoven fabric treatment agent that contains a surfactant, at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats, and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule and containing a zinc compound and water.

[0024] Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

[0025] An aqueous liquid of viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) for solving the above problem is characterized by containing a viscose rayon nonwoven fabric treatment agent that contains a surfactant and at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones and containing a zinc compound and water.

[0026] The aqueous liquid of viscose rayon nonwoven fabric treatment agent is preferably one with which the surfactant includes at least one selected from among anionic surfactants and nonionic surfactants.

[0027] An aqueous liquid of viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) for solving the above problem is characterized by containing a viscose rayon nonwoven fabric treatment agent that contains at least an anionic surfactant as a surfactant and containing a zinc compound and water.

[0028] The aqueous liquid of viscose rayon nonwoven fabric treatment agent preferably further contains a nonionic surfactant.

[0029] Preferably with the aqueous liquid of viscose rayon nonwoven fabric treatment agent, the surfactant includes the nonionic surfactant and the nonionic surfactant includes at least one fatty acid derivative selected from among compounds with which an alkylene oxide with 2 to 4 carbon atoms is added at a ratio of 0.1 to 30 moles with respect to 1 mole of a fatty acid with 12 to 24 carbon atoms and ester compounds of a fatty acid with 12 to 24 carbon atoms and a polyethylene glycol.

[0030] Preferably with the aqueous liquid of viscose rayon nonwoven fabric treatment agent, if the total content of the

zinc compound, the surfactant, and water is taken as 100% by mass, the zinc compound is contained at a ratio of 0.00001% to 0.4% by mass.

[0031] The aqueous liquid of viscose rayon nonwoven fabric treatment agent preferably further contains at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule. The oils and fats are at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

[0032] The aqueous liquid of viscose rayon nonwoven fabric treatment agent preferably further contains at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

[0033] Preferably with the aqueous liquid of viscose rayon nonwoven fabric treatment agent, the zinc compound is contained in the aqueous liquid at a ratio of 0.00001% to 0.3% by mass.

[0034] A viscose rayon for solving the above problem is characterized in that the aqueous liquid of viscose rayon nonwoven fabric treatment agent is adhered thereto.

[0035] A method for manufacturing a viscose rayon (excluding a deodorant regenerated cellulose fiber with which a carboxylic-group-containing polymer is contained in the cellulose fiber) for a nonwoven fabric for solving the above problem is characterized by including adhering an aqueous liquid (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) that contains a zinc compound and a surfactant to a viscose rayon.

[0036] A method for manufacturing a viscose rayon for a nonwoven fabric for solving the above problem is characterized by including adhering an aqueous liquid (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) that contains a zinc compound, a surfactant, at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats, and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule to a viscose rayon.

[0037] Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

[0038] A method for manufacturing a viscose rayon for a nonwoven fabric for solving the above problem is characterized by including adhering an aqueous liquid (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) that contains a zinc compound, a surfactant, and at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones to a viscose rayon.

[0039] A method for manufacturing a viscose rayon for a nonwoven fabric for solving the above problem is characterized by including adhering an aqueous liquid (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) that contains a zinc compound and at least an anionic surfactant as a surfactant to a viscose rayon.

[0040] Preferably with the method for manufacturing a viscose rayon for a nonwoven fabric, the aqueous liquid further contains at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

[0041] Preferably with the method for manufacturing a viscose rayon for a nonwoven fabric, the zinc compound is contained in the aqueous liquid at a ratio of 0.00001% to 0.3% by mass.

[0042] Preferably with the method for manufacturing a viscose rayon for a nonwoven fabric, the zinc compound, the surfactant, the polyhydric alcohol, the lubricating oil, and the at least one selected from among the fatty acids and the oils and fats are adhered such as to be 0.01% to 1.0% by mass in total with respect to the viscose rayon.

EFFECT OF THE INVENTION

[0043] By the present invention, the aqueous liquid that is prepared can be improved in appearance and foaming, especially foaming in a step of adhering the aqueous liquid can be reduced.

MODES FOR CARRYING OUT THE INVENTION

(First Embodiment)

[0044] A first embodiment that embodies a viscose rayon nonwoven fabric treatment agent according to the present invention (hereinafter referred to as treatment agent in some cases) will now be described. The treatment agent contains a zinc compound and a surfactant. With the present invention, the treatment agent excludes a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto. That is, the treatment agent of the present invention is different from such a shading composition and is not a treatment agent used for shading processing of a fabric such as a woven fabric.

[0045] The zinc compound reduces foaming of the treatment agent that contains the surfactant. Examples of the zinc compound include a salt of an inorganic acid, a salt of an organic acid, zinc chloride, zinc oxide, zinc sulfide, zinc paraphenol sulfonate. Specific examples of a salt of an inorganic acid include zinc sulfate, zinc acetate, zinc nitrate, zinc carbonate, zinc chromate, zinc stannate, zinc phosphate, and zinc molybdate. Specific examples of a salt of an organic

acid include zinc laurate, zinc gluconate, and zinc stearate. With these zinc compounds, one type may be used alone or two or more types may be used in combination.

[0046] If the total content of the zinc compound and the surfactant in the treatment agent is taken as 100% by mass, the lower limit of the content of the zinc compound, although not restricted in particular, is preferably not less than 0.001% by mass and more preferably not less than 0.01% by mass. If the content of the zinc compound is not less than 0.001 % by mass, foaming of a prepared aqueous liquid can be reduced further. The upper limit of the content of the zinc compound, although not restricted in particular, is preferably not more than 5% by mass and more preferably not more than 3% by mass. If the content of the zinc compound is not more than 5% by mass, influence on impartment of nonwoven fabric manufacturing characteristics by the surfactant to be described below can be suppressed.

[0047] The surfactant improves the stability of an emulsion obtained from the treatment agent and improves appearance of the aqueous liquid. As a lubricating component or bundling component, it can impart excellent nonwoven fabric manufacturing characteristics to a raw material fiber of rayon. Examples of the surfactant include an anionic surfactant, a cationic surfactant, and a nonionic surfactant. With these surfactants, one type may be used alone or two or more types may be used in combination.

[0048] Specific examples of an anionic surfactant include (1) alkali metal salts of sulfuric acid esters of fatty acids with 8 to 24 carbon atoms, such as alkali metal salts of castor oil fatty acid sulfuric acid esters, alkali metal salts of sesame oil fatty acid sulfuric acid esters, alkali metal salts of tall oil fatty acid sulfuric acid esters, alkali metal salts of soybean oil fatty acid sulfuric acid esters, alkali metal salts of rapeseed oil fatty acid sulfuric acid esters, alkali metal salts of palm oil fatty acid sulfuric acid esters, alkali metal salts of lard fatty acid sulfuric acid esters, alkali metal salts of tallow fatty acid sulfuric acid esters, and alkali metal salts of whale oil fatty acid sulfuric acid esters, (2) alkali metal salts of sulfuric acid esters of aliphatic alcohols with 8 to 24 carbon atoms, such as alkali metal salts of lauryl sulfuric acid ester, alkali metal salts of cetyl sulfuric acid ester, alkali metal salts of oleyl sulfuric acid ester, and alkali metal salts of stearyl sulfuric acid ester, (3) alkali metal salts of sulfuric acid esters of compounds having a total of 1 to 20 moles (representing the average number of moles added) of an alkylene oxide with 2 to 4 carbon atoms added to an aliphatic alcohol with 8 to 24 carbon atoms, such as alkali metal salts of sulfuric acid ester of polyoxyethylene (with the number of oxyethylene units being 3; hereinafter indicated as n = 3) lauryl ether, alkali metal salts of sulfuric acid ester of polyoxyethylene (n = 5) lauryl ether, alkali metal salts of sulfuric acid ester of polyoxyethylene (n = 3) polyoxypropylene (with the number of oxypropylene units being 3; hereinafter indicated as m = 3) lauryl ether, alkali metal salts of sulfuric acid ester of polyoxyethylene (n = 3) oleyl ether, and alkali metal salts of sulfuric acid ester of polyoxyethylene (n = 5) oleyl ether, (4) alkali metal salts of aliphatic alkyl phosphoric acid esters with 8 to 24 carbon atoms, such as alkali metal salts of lauryl phosphoric acid ester, alkali metal salts of cetyl phosphoric acid ester, alkali metal salts of oleyl phosphoric acid ester, and alkali metal salts of stearyl phosphoric acid ester, (5) alkali metal salts of aliphatic alkyl sulfonic acids with 8 to 24 carbon atoms, such as alkali metal salts of lauryl sulfonic acid ester, alkali metal salts of cetyl sulfonic acid ester, alkali metal salts of oleyl sulfonic acid ester, alkali metal salts of stearyl sulfonic acid ester, and alkali metal salts of tetradecane sulfonic acid ester, (6) alkali metal salts of phosphoric acid esters of compounds having a total of 1 to 20 moles (representing the average number of moles added) of an alkylene oxide with 2 to 4 carbon atoms added to an aliphatic alcohol, such as alkali metal salts of polyoxyethylene (n = 5) lauryl ether phosphoric acid ester, alkali metal salts of polyoxyethylene (n = 5) oleyl ether phosphoric acid ester, and alkali metal salts of polyoxyethylene (n = 10) stearyl ether phosphoric acid ester, (7) sulfated oils, such as sulfuric acid esters of oils and fats (for example, sulfuric acid ester of castor oil, sulfuric acid ester of sesame oil, sulfuric acid ester of tall oil, sulfuric acid ester of soybean oil, sulfuric acid ester of rapeseed oil, sulfuric acid ester of palm oil, sulfuric acid ester of lard, sulfuric acid ester of tallow, and sulfuric acid ester of whale oil), amine salts thereof, or alkali metal salts thereof, (8) alkali metal salts of fatty acids, such as alkali metal salts of lauric acid, alkali metal salts of oleic acid, and alkali metal salts of stearic acid, and (9) alkali metal salts of sulfosuccinic acid esters of aliphatic alcohols, such as alkali metal salts of dioctyl sulfosuccinic acid.

[0049] Specific examples of alkali metal salts that constitute the anion surfactants mentioned above include sodium salts and potassium salts. Specific examples of amine salts that constitute the anion surfactants mentioned above include (1) aliphatic amines, such as methylamine, dimethylamine, trimethylamine, ethylamine, diethylamine, triethylamine, N-N-diisopropylethylamine, butylamine, dibutylamine, 2-methylbutylamine, tributylamine, octylamine, and dimethyllaurylamine, (2) aromatic amines or heterocyclic amines, such as aniline, N-methylbenzylamine, pyridine, morpholine, piperazine, and derivatives thereof, (3) alkanolamines, such as monoethanolamine, N-methylethanolamine, diethanolamine, triethanolamine, isopropanolamine, diisopropanolamine, triisopropanolamine, dibutylethanolamine, butyldiethanolamine, octyldiethanolamine, and lauryldiethanolamine, (4) aryl amines, such as N-methylbenzylamine (5) polyoxyalkylene alkyl aminoethers, such as polyoxyethylene lauryl aminoethers and polyoxyethylene stearyl aminoethers, and (6) ammonia.

[0050] Specific examples of a cationic surfactant include lauryltrimethylammonium chloride, cetyltrimethylammonium chloride, stearyltrimethylammonium chloride, behenyltrimethylammonium chloride, and didecyldimethylammonium chloride.

[0051] Specific examples of a nonionic surfactant include (1) polyoxyalkylene alkyl (or alkenyl) ethers obtained by

making an alkylene oxide undergo an addition reaction with a saturated or unsaturated aliphatic monohydric alcohol, such as polyoxyethylene (n = 10) lauryl ether, polyoxyethylene (n = 20) stearyl ether, polyoxyethylene (n = 30) oleyl ether, polyoxyethylene (n = 10) alkyl (12 to 13 carbon atoms) ether, and polyoxyalkylene (n = 10, m = 10) lauryl ethers, (2) polyoxyalkylene polyhydric alcohol ethers obtained by making an alkylene oxide undergo an addition reaction with an aliphatic polyhydric alcohol, such as polyoxyethylene (n = 10) sorbitan monolaurate, polyoxyethylene (n = 20) sorbitan monooleate, polyoxyethylene (n = 20) sorbitan monostearate, and polyoxyethylene (n = 20) sorbitan tristearate, (3) polyoxyalkylene alkyl (or alkylene) esters as fatty acid derivatives obtained by making an alkylene oxide undergo an addition reaction with 1 mole of a saturated or unsaturated fatty acid, such as polyoxyethylene (n = 20) oleate, polyoxyethylene (n = 10) oleate, polyoxyethylene (n = 30) oleate, polyoxyethylene (n = 5) stearate, polyoxyethylene (n = 10) stearate, polyoxyethylene (n = 10) lauryl ester, and polyoxyalkylene (n = 10, m = 10) stearyl esters, (4) polyalkylene glycol alkyl (or alkylene) esters as fatty acid derivatives obtained by making a polyalkylene glycol undergo an addition reaction with a saturated or unsaturated fatty acid, such as polyethylene glycol (average molecular weight: 400) monooleate, polyethylene glycol (average molecular weight: 600) dioleate, polyethylene glycol (average molecular weight: 1000) monostearate, polyethylene glycol (average molecular weight: 400) dilaurate, and polyethylene glycol (average molecular weight: 1000) distearate, (5) oil and fat esters of polyoxyalkylenes as fatty acid derivatives obtained by making an alkylene oxide undergo an addition reaction with an oil or fat, such as polyoxyethylene (n = 30) castor oil ester, polyoxyalkylene (n = 10, m = 10) castor oil esters, polyoxyethylene (n = 10) hydrogenated castor oil ester, and reaction product of coconut fatty acid with 10 moles of ethylene oxide, (6) polyoxyalkylene alkylphenol ethers obtained by making an alkylene oxide undergo an addition reaction with an alkylphenol, such as polyoxyethylene (n = 10) octylphenol ether and polyoxyethylene (n = 10) nonylphenol ether, and (7) polyoxyalkylene aminoethers obtained by making an alkylene oxide undergo an addition reaction with a saturated or unsaturated aliphatic amine, such as polyoxyethylene (n = 5) octyl aminoether, polyoxyethylene (n = 8) lauryl aminoether, and polyoxyethylene (n = 20) stearyl aminoether.

[0052] Specific examples of an alkylene oxide used as a raw material of a nonionic surfactant include ethylene oxide and propylene oxide. The number of moles of alkylene oxide added is set as appropriate and is preferably 0.1 to 60 moles, more preferably 0.1 to 30 moles, and even more preferably 2 to 30 moles. The number of moles of alkylene oxide added represents the number of moles of the alkylene oxide with respect to 1 mole of the alcohol or the carboxylic acid in charged raw materials.

[0053] Also, if ethylene oxide and propylene oxide are given as alkylene oxides, the form of addition of ethylene oxide and propylene oxide is not restricted in particular and may be any among block addition, random addition, and combinations of block addition and random addition.

[0054] Among the above, the fatty acid derivatives of (3) to (5) are preferable from a viewpoint of being able to impart excellent nonwoven fabric manufacturing characteristics and the fatty acid derivatives that are compounds with which an alkylene oxide with 2 to 4 carbon atoms is added at a ratio of 0.1 to 30 moles with respect to 1 mole of a fatty acid with 12 to 24 carbon atoms and ester compounds of 12 to 24 carbon atom fatty acid polyethylene glycols are more preferable.

[0055] The treatment agent preferably further contains at least one selected from among fatty acids with 12 to 24 carbon atoms and oils and fats and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule. The oils and fats are at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof. By being blending in, these components impart a raw material fiber of rayon with excellent nonwoven fabric manufacturing characteristics as lubricating or bundling components. These also reduce foaming of the aqueous liquid prepared from the treatment agent. With the fatty acids with 12 to 24 carbon atoms and the abovementioned oils and fats, one type may be used alone or two or more types may be used in combination. With the polyhydric alcohols having 2 to 6 hydroxyl groups in the molecule, one type may be used alone or two or more types may be used in combination.

[0056] Specific examples of the fatty acids with 12 to 24 carbon atoms include lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid, linolenic acid, arachidic acid, behenic acid, lignoceric acid, and coconut fatty acid.

[0057] Specific examples of the oils and fats include castor oil, sesame oil, tall oil, palm oil, palm kernel oil, coconut oil, rapeseed oil, lard, tallow, whale oil, and hydrogenated oils of these oils.

[0058] Specific examples of the polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule include ethylene glycol, propylene glycol, pentanediol, hexanediol, glycerin, pentaerythritol, sorbitol, sorbitan, polyethylene glycol, polypropylene glycol, and reaction products of propylene glycol with an alkylene oxide.

[0059] Preferably, the treatment agent further contains a lubricating oil. The lubricating oil is at least one selected from among hydrocarbon compounds, esters, and silicones. By being blending in, the lubricating oil imparts the raw material fiber of rayon with excellent nonwoven fabric manufacturing characteristics as a lubricating or bundling component. It also improves the stability of the emulsion obtained from the treatment agent and improves the appearance of the aqueous liquid. With the lubricating oil, one type may be used alone or two or more types may be used in combination.

[0060] Specific examples of hydrocarbon compounds include mineral oils and paraffin wax.

[0061] Specific examples of esters include butyl stearate, stearyl stearate, glycerin monooleate, glycerin trioleate, sorbitan monolaurate, sorbitan trilaurate, sorbitan monooleate, sorbitan trioleate, sorbitan monostearate, and sorbitan

tristearate.

[0062] Specific examples of silicones include dimethyl silicone, amino modified silicone, and polyoxyalkylene modified silicones.

[0063] In the treatment agent containing the components mentioned above, the lower limit of the content of the zinc compound, although not restricted in particular, is preferably not less than 0.001% by mass and more preferably not less than 0.01% by mass. If the content of the zinc compound is not less than 0.001% by mass, the foaming of the prepared aqueous liquid can be reduced further. The upper limit of the content of the zinc compound, although not restricted in particular, is preferably not more than 1% by mass. If the content of the zinc compound is not more than 1% by mass, the appearance of the prepared aqueous liquid can be improved further.

[0064] The contents of the respective components mentioned above in the treatment agent are set as appropriate from viewpoints of the effects of the present invention and imparting of nonwoven fabric manufacturing characteristics. For example, an anionic surfactant is used in a range of 1% to 40% by mass, a nonionic surfactant is used in a range of 5% to 97.89% by mass, at least one selected from among fatty acids and oils and fats is used in a range of 0.01% to 25% by mass, a polyhydric alcohol is used in a range of 0.1% to 90% by mass, and a lubricating oil is used in a range of 1% to 20% by mass.

[0065] It is noted that, depending on the surfactant or oil used, transition metal ions are contained at times in the treatment agent. For example, a transition metal, such as Ti, Mo, Mn, or Sn, is used as a catalyst in synthesizing an ester and residual transition metal ions are thus contained at times in the treatment agent. As with Ca ions, a foam reducing effect can also be obtained from transition metal ions. From a viewpoint of exhibiting the foam reducing effect in the aqueous liquid, the transition metal ion concentration in the treatment agent is preferably 10 ppm to 30,000 ppm and more preferably 10 ppm to 10,000 ppm.

(Second Embodiment)

[0066] Next, a second embodiment that embodies a viscose rayon according to the present invention will be described. The viscose rayon of the present embodiment has the treatment agent of the first embodiment adhered thereto. As an adhering method, a known method, such as an immersion method, a spraying method, a roller method, a shower method, and a dropping/flow-down method, can be applied. Although not restricted in particular, adhering is conducted in, for example, a yarn spinning step or a post-process step of a refining step. The viscose rayon of the present invention is different from a deodorant regenerated cellulose fiber with which a carboxylic-group-containing polymer is contained in the cellulose fiber.

[0067] Examples of a form of the treatment agent of the first embodiment in the process of adhering the treatment agent to a viscose rayon fiber include an aqueous liquid. It is not prohibited for a small amount of an organic solvent to be contained within a range in which the effects of the present invention are not impaired. As a treatment method of the viscose rayon fiber, it is preferable to dilute the treatment agent of the first embodiment with water to form an aqueous liquid with a concentration, for example, of 0.5% to 30% by mass and adhere the aqueous liquid such that a ratio as the treatment agent of the first embodiment not including solvent will be 0.01% to 1% by mass with respect to the viscose rayon fiber. By undergoing the step of adhering the treatment agent to the viscose rayon fiber, a viscose rayon for nonwoven fabric manufacturing is obtained. If the viscose rayon with the treatment agent of the first embodiment adhered thereto is further passed through a carding machine and manufactured as a nonwoven fabric, the type of card is not restricted in particular and examples thereof include a flat card, a combination card, and a roller card.

(Third Embodiment)

[0068] A third embodiment that embodies an aqueous liquid of viscose rayon nonwoven fabric treatment agent according to the present invention (hereinafter referred to as aqueous liquid in some case) will now be described. The aqueous liquid contains a surfactant-containing viscose rayon nonwoven fabric treatment agent, a zinc compound, and water. With the present invention, the aqueous liquid excludes a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto. That is, the aqueous liquid of the present invention is different from such a shading composition and is not an aqueous liquid used for shading processing of a fabric such as a woven fabric.

[0069] The surfactant improves emulsion stability of the aqueous liquid and improves appearance of the aqueous liquid. Also, as a lubricating or bundling component, it imparts excellent nonwoven fabric manufacturing characteristics to the raw material fiber of rayon. As specific examples of the surfactant, the specific examples given for the first embodiment can be adopted.

[0070] The zinc compound reduces foaming of the aqueous liquid that contains the surfactant. The aqueous liquid may be prepared by mixing the treatment agent and the zinc compound and thereafter mixing water therewith or may be prepared by mixing the treatment agent and water and thereafter blending the zinc compound therein. As specific

examples of the zinc compound, the specific examples given for the first embodiment can be adopted.

[0071] If the total content of the zinc compound, the surfactant, and water in the aqueous liquid is taken as 100% by mass, the lower limit of the content of the zinc compound, although not restricted in particular, is preferably not less than 0.00001% by mass and more preferably not less than 0.0001% by mass. If the content of the zinc compound is not less than 0.00001% by mass, the foaming of the aqueous liquid can be reduced further. The upper limit of the content of the zinc compound, although not restricted in particular, is preferably not more than 0.4% by mass and more preferably not more than 0.35% by mass. If the content of the zinc compound is not more than 0.4% by mass, the appearance of the aqueous liquid can be improved further.

[0072] Preferably, the aqueous liquid further contains at least one selected from among fatty acids with 12 to 24 carbon atoms and the oils and fats indicated below and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule. The oils and fats are at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof. By being blending in, these components impart the raw material fiber of rayon with excellent nonwoven fabric manufacturing characteristics as lubricating or bundling components. As specific examples of these components, the specific examples given for the first embodiment can be adopted.

[0073] Preferably, the aqueous system further contains a lubricating oil. The lubricating oil is at least one selected from among hydrocarbon compounds, esters, and silicones. By being blending in, the lubricating oil imparts the raw material fiber of rayon with excellent nonwoven fabric manufacturing characteristics as a lubricating or bundling component. It also improves the stability of the aqueous liquid and improves the appearance of the aqueous liquid.

[0074] In the aqueous liquid that contains the above components, the lower limit of the content of the zinc compound, although not restricted in particular, is preferably not less than 0.00001% by mass and more preferably not less than 0.0001% by mass. If the content of the zinc compound is not less than 0.00001% by mass, foaming of the aqueous liquid can be reduced further. The upper limit of the content of the zinc compound, although not restricted in particular, is preferably not more than 0.3% by mass. If the content of the zinc compound is not more than 0.3% by mass, the appearance of the aqueous liquid can be improved further.

[0075] The contents of the respective components mentioned above in the aqueous liquid are set as appropriate from viewpoints of the effects of the present invention and imparting of nonwoven fabric manufacturing characteristics. For example, an anionic surfactant is used in a range of 0.001% to 6% by mass, a nonionic surfactant is used in a range of 0.005% to 30% by mass, at least one selected from among fatty acids and oils and fats is used in a range of 0.00001% to 10% by mass, a polyhydric alcohol is used in a range of 0.0001% to 27% by mass, a lubricating oil is used in a range of 0.001% to 6% by mass, and water is used in a range of 70% to 99.9% by mass.

[0076] The concentration of solids other than solvent in the aqueous liquid is set as appropriate in accordance with a method of adhering onto rayon, etc., and is, for example, a concentration of 0.5% to 30% by mass.

(Fourth Embodiment)

[0077] Next, a fourth embodiment that embodies a viscose rayon according to the present invention will be described. The viscose rayon of the present embodiment has the aqueous liquid of the third embodiment adhered thereto. As an adhering method, a known method, such as an immersion method, a spraying method, a roller method, a shower method, and a dropping/flow-down method, can be applied. Although not restricted in particular, adhering is conducted in, for example, a yarn spinning step or a post-process step of a refining step. The aqueous liquid is preferably adhered such that a ratio as solids (total of the zinc compound, the surfactant, the polyhydric alcohol, the lubricating oil, and the at least one selected from among the fatty acids and the oils and fats) not including solvent will be 0.01% to 1% by mass with respect to a viscose rayon fiber. By applying at such ratio, excellent nonwoven fabric manufacturing characteristics can be imparted in particular to the rayon fiber. By undergoing the step of adhering the aqueous liquid to the viscose rayon fiber, a viscose rayon for nonwoven fabric manufacturing is obtained.

[0078] If the viscose rayon with the aqueous liquid of the third embodiment adhered thereto is subject to drying treatment and thereafter further passed through a carding machine to manufacture a nonwoven fabric, the type of card is not restricted in particular and examples thereof include a flat card, a combination card, and a roller card.

[0079] The operation and effects of the treatment agent, the aqueous liquid, and the viscous rayon of the embodiments will now be described.

(1) The treatment agent or the aqueous liquid of the embodiments contains the zinc compound. Therefore, foaming during preparation of the aqueous liquid from the treatment agent and foaming during use of the aqueous liquid and especially foaming in a step of adhering the aqueous liquid can be reduced. Also, the surfactant improves the stability of the emulsion that is obtained from the treatment agent and improves the appearance of the aqueous liquid.

(2) In particular, the treatment agent or the aqueous liquid of the embodiments can reduce foaming even when applied to a fiber by a method such as an immersion method, a spraying method, a shower method, or a dropping/flow-down method in which foaming occurs readily.

(3) The treatment agent or the aqueous liquid of the embodiments can improve the stability of the emulsion and reduce foaming. Therefore, the treatment agent or the aqueous liquid can be applied to the viscose rayon uniformly and the nonwoven fabric manufacturing characteristics are improved further.

[0080] The embodiments described above can be modified as follows. The embodiments described above and the following modifications can be implemented upon being combined with each other within a range that is not technically inconsistent.

· As stabilizers and antistatic agents for quality maintenance of the treatment agent or the aqueous liquid of the embodiments described above, surfactants, electrostatic preventing agents, binders, antioxidants, ultraviolet absorbers, pH adjusters, and other components besides those mentioned above and ordinarily used in the treatment agent or the aqueous liquid may further be blended in the treatment agent or the aqueous liquid within a range that does not impair the effects of the present invention.

· The type of water used in preparing the aqueous liquid of the embodiments described above is not restricted in particular and may be distilled water that hardly contains any impurities or may be hard water or soft water that contains Ca ions or Mg ions. From a viewpoint of obtaining a foaming reducing effect by Ca ions and Mg ions, soft water or hard water is preferably applied. From a viewpoint of exhibiting the foaming reducing effect, the concentration of metal ions, such as Ca ions, in the aqueous liquid is preferably 0.1 ppm to 10,000 ppm and more preferably 0.1 ppm to 100 ppm.

[0081] Also, depending on the surfactant or oil used, transition metal ions are contained at times in the treatment agent. For example, a transition metal, such as Ti, Mo, Mn, or Sn, is used as a catalyst in synthesizing an ester and residual transition metal ions are thus contained at times in the treatment agent. As with Ca ions, a foam reducing effect can also be obtained from transition metal ions. From a viewpoint of exhibiting the foam reducing effect, the transition metal ion concentration in the aqueous liquid is preferably 0.1 ppm to 10,000 ppm and more preferably 0.1 ppm to 1,000 ppm.

EXAMPLES

[0082] Examples will be given below to describe the features and the effects of the present invention more specifically, but the present invention is not restricted to these examples. In the following description of working examples and comparative examples, parts means parts by mass and % means % by mass.

Experimental Part 1 (Preparation of viscose rayon nonwoven fabric treatment agents)

(Example 1)

[0083] The following materials were used as raw materials of a treatment agent. The numerical values of the respective components represent the contents in the treatment agent.

Zinc compound: Zinc acetate (A-1) 0.01%
Nonionic surfactant: Polyoxyethylene (n = 20) oleate (B-1) 20%
Anionic surfactant: Potassium salt of lauryl phosphoric acid ester (C-1) 3%
Oil or fat: Tallow (D-1) 5%
Polyhydric alcohol: Ethylene glycol (E-1) 69.99%
Lubricating oil: Stearyl stearate (F-1) 2%

(Examples 2 to 21 and Comparative Examples 1 and 2)

[0084] Besides adopting the materials and blending ratios shown in Table 1, treatment agents were prepared by the same procedure as in Example 1. The types of the respective components used in the respective examples and the contents (%) of the respective components in the treatment agents are shown in the "Zinc compound" column, the "Nonionic surfactant" column, the "Anionic surfactant" column, the "Fatty acid or fat or oil" column, the "Polyhydric alcohol" column, and the "Lubricating oil" column in Table 1.

Table 1

Category	Viscose rayon nonwoven fabric treatment agent												Aqueous liquid appearance	Aqueous liquid foam test
	Zinc compound			Nonionic surfactant		Anionic surfactant		Fatty acid or fat or oil		Polyhydric alcohol		Lubricating oil		
	Type	Amount used (%)	*1 Amount used (% by mass)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	
Example 1	A-1	0.01	0.04	B-1	20	C-1	3	D-1	5	E-1	69.99	F-1	2	○○	○○
Example 2	A-1	0.1	0.12	B-2 B-3	10 69.9	C-2	1	D-2	5	E-2	5	F-2	9	○○ ○○	○○ ○○
Example 3	A-2	0.01	0.02	B-4	44.99	C-3	5	D-3	9	E-3	40	F-3	1	○○	○○
Example 4	A-3	0.01	0.015	B-5	49.99	C-4	15	D-4	0.5	E-4	19.5	F-4	15	○○	○○
Example 5	A-3	1	1.54	B-2	64			D-2	5	E-5 E-6	5 15	F-2	10	○○ ○○	○○ ○○
Example 6	A-1	1	4.76	B-6	20			D-5	5	E-7	69	F-5	5	○○	○○
Example 7	A-2	1	2.5	B-7	39			D-6	10	E-8	40	F-6	10	○○	○○
Example 8	A-2	1	1.61	B-2 B-8	9 39	C-1 C-5	4 9	D-1	21	E-2	2	F-7	15	○○ ○○	○○ ○○
Example 9	A-3	0.1	0.13	B-10	79.9	C-2	5	D-2	2	E-2	5	F-11	8	○○	○○
Example 10	A-1	1	1.32	B-7	70	C-4	5	D-6	5	E-5 E-9	5 5	F-9 F-10	6 3	○○	○○
Example 11	A-1	0.1	0.11	B-6	79.9	C-3	10	D-6	5	E-5	5			○	○○
Example 12	A-3	0.1	0.22	B-3	45.5	C-2	1	D-7	3.9	E-3	49.5			○	○○
Example 13	A-1	0.1	0.12	B-7	79.9	C-2	5	D-2 D-8	2 3	E-5	10			○	○○ ○○
Example 14	A-1	1	1.82	B-9	50	C-6	4	D-9	6	E-9	39			○	○○
Example 15	A-2	1	1	B-6	89.8	C-3	9	D-14	0.05	E-2	0.15			○	○○
Example 16	A-2	1	1.15	B-7	86			D-10	3	E-5	10			○	○○
Example 17	A-2	0.1	0.11	B-1 B-10	40 29.9	C-3	20					F-8	10	○○	○

(continued)

Category	Viscose rayon nonwoven fabric treatment agent													Aqueous liquid appearance	Aqueous liquid foam test
	Zinc compound			Nonionic surfactant		Anionic surfactant		Fatty acid or fat or oil		Polyhydric alcohol		Lubricating oil			
	Type	Amount used (%)	*1 Amount used (% by mass)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)		
Example 18	A-3	1	1	B-3	89	C-2	10							○	○
Example 19	A-2	2	3.23	B-2 B-8	9 38	C-1 C-5	4 9	D-1	21	E-2	2	F-7	15	○	○○
Example 20	A-1	0.0005	0.0008	B-2 B-4	9 38	C-3	14.9995	D-1	21	E-2	2	F-7	15	○○	○
Example 21	A-1	1	2.44			C-3 C-6	35 5			E-2 E-5	20 20	F-1	19	○	○
Comparative Example 1				B-1	20	C-1	3	D-1	5	E-1	70	F-1	2	○○	×
Comparative Example 2	A-1	1	100					D-5	5	E-2	70	F-8	24	×	○○

[0085] In Table 1,

A-1 represents zinc acetate,
A-2 represents zinc sulfate,
A-3 represents zinc nitrate,
B-1 represents polyoxyethylene (n = 20) oleate,
B-2 represents polyoxyethylene (n = 5) stearate,
B-3 represents polyoxyethylene (n = 10) stearate,
B-4 represents polyethylene glycol (average molecular weight: 400) dilaurate,
B-5 represents polyethylene glycol (average molecular weight: 1000) distearate,
B-6 represents a reaction product of coconut fatty acid with 10 moles of ethylene oxide,
B-7 represents polyethylene glycol (average molecular weight: 600) dioleate,
B-8 represents polyoxyethylene (n = 10) oleate,
B-9 represents polyoxyethylene (n = 30) oleate,
B-10 represents polyethylene glycol (average molecular weight: 400) monooleate,
C-1 represents potassium salt of lauryl phosphoric acid ester,
C-2 represents sodium salt of dioctyl sulfosuccinate,
C-3 represents sodium salt of tetradecanesulfonate,
C-4 represents sodium oleate,
C-5 represents sodium salt of tallow sulfuric acid ester,
C-6 represents potassium stearate,
D-1 represents tallow,
D-2 represents stearic acid,
D-3 represents palmitic acid,
D-4 represents coconut oil,
D-5 represents palm oil,
D-6 represents behenic acid,
D-7 represents hydrogenated palm oil,
D-8 represents hydrogenated castor oil,
D-9 represents castor oil,
D-10 represents oleic acid,
D-11 represents lard,
D-12 represents tall oil,
D-13 represents lauric acid,
D-14 represents coconut fatty acid,
E-1 represents ethylene glycol,
E-2 represents polyethylene glycol (average molecular weight: 400),
E-3 represents polypropylene glycol (average molecular weight: 600),
E-4 represent propylene glycol,
E-5 represents polyethylene glycol (average molecular weight: 600),
E-6 represents a reaction product of propylene glycol with an alkylene oxide (average molecular weight: 3000)
E-7 represents polyethylene glycol (average molecular weight: 2000),
E-8 represents sorbitan,
E-9 represents sorbitol,
E-10 represents glycerin,
F-1 represents stearyl stearate,
F-2 represents a mineral oil (viscosity: 500 seconds),
F-3 represents dimethyl silicone,
F-4 represents a mineral oil (viscosity: 180 seconds),
F-5 represents aminosilicone,
F-6 represents paraffin wax,
F-7 represents a mineral oil (viscosity: 60 seconds),
F-8 represents glycerin monooleate,
F-9 represents a mineral oil (viscosity: 80 seconds),
F-10 represents sorbitan tristearate,
F-11 represents sorbitan monostearate,
G-1 represents water, and
*1 represents the content of the zinc compound if the total content of the zinc compound and the surfactant is taken

as 100% by mass.

Experimental Part 2 (Evaluation of treatment agents)

(Evaluation tests)

[0086] Aqueous liquid appearance and aqueous liquid foam tests were performed using the treatment agents of Examples 1 to 21 and Comparative Examples 1 and 2. The procedures of the respective tests are described below. Also, the test results are shown in the "Aqueous liquid appearance" column and the "Aqueous liquid foam test" column of Table 1.

(Aqueous liquid appearance)

[0087] To 10 parts of the treatment agent of each example prepared such as to be of the blending ratios given above, 990 parts of water were added and stirring at 50°C was performed to prepare an aqueous liquid containing 1% of the treatment agent. The appearance of the aqueous liquid was checked visually and evaluated based on the following criteria.

· Evaluation criteria for aqueous liquid appearance

[0088]

∞ (excellent): Precipitation of scum is not seen.
◦ (satisfactory): Although scum is slightly precipitated, it mostly floats on the surface and is not of a level that presents a problem in terms of practical use.
× (poor): Much scum is precipitated and the appearance is poor.

(Aqueous liquid foam test)

[0089] 1% aqueous liquids of the treatment agents obtained in Experimental Part 1 were prepared using distilled water and thereafter kept warm at 50°C. Next, 25 g of each aqueous liquid were placed in a 100 mL stoppered graduated cylinder and shaken strongly 30 times in 30 seconds and, after leaving still for 30 seconds, shaken strongly 30 times in 30 seconds again. After then leaving still for 5 minutes, a height from the water surface to the upper surface of foam was measured.

· Evaluation criteria for aqueous liquid foam test

[0090]

∞ (excellent): The height from the water surface to the upper surface of foam is less than 5 cm.
◦ (satisfactory): The height from the water surface to the upper surface of foam is not less than 5 cm but less than 10 cm.
× (poor): The height from the water surface to the upper surface of foam is not less than 10 cm.

[0091] As is clear from the results in Table 1, the effect of suppressing the foaming of the aqueous liquid without degrading the appearance of the aqueous liquid is provided by the present invention.

Experimental Part 3 (Preparation of aqueous liquids of viscose rayon nonwoven fabric treatment agent)

(Example 22)

[0092] The following materials were used as raw materials of an aqueous liquid. The numerical values of the respective components represent the contents in the aqueous liquid.

Zinc compound: Zinc acetate (A-1) 0.0001%
Nonionic surfactant: Polyoxyethylene (n = 20) oleate (B-1) 0.2%
Anionic surfactant: Potassium salt of lauryl phosphoric acid ester (C-1) 0.03%
Oil or fat: Tallow (D-1) 0.05%
Polyhydric alcohol: Ethylene glycol (E-1) 0.6999%
Lubricating oil: Stearyl stearate (F-1) 0.02%

[0093] To 10 parts of a treatment agent prepared such as to be of the blending ratios given above, 990 parts of water were added and stirring at 50°C was performed to prepare an aqueous liquid containing 1% of the treatment agent.

(Examples 23 to 42 and Comparative Examples 3 and 4)

[0094] Besides adopting the materials and blending ratios shown in Table 2, aqueous liquids were prepared by the same procedure as in Example 22. The types of the respective components used in the respective examples and the contents (%) of the respective components in the aqueous liquids are shown in the "Zinc compound" column, the "Nonionic surfactant" column, the "Anionic surfactant" column, the "Fatty acid or fat or oil" column, the "Polyhydric alcohol" column, and the "Lubricating oil" column in Table 2.

Table 2

Category	Aqueous liquid of viscose rayon nonwoven fabric treatment agent														Aqueous liquid appearance	Aqueous liquid foam test
	Zinc compound			Nonionic surfactant		Anionic surfactant		Fatty acid or fat or oil		Polyhydric alcohol		Lubricating oil		Water		
	Type	Amount used (%)	*2 Amount used (% by mass)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	
Example 22	A-1	0.0001	0.0001	B-1	0.2	C-1	0.03	D-1	0.05	E-1	0.6999	F-1	0.02	G-1	99	○○	○○
Example 23	A-1	0.001	0.001	B-2 B-3	0.1 0.699	C-2	0.01	D-2	0.05	E-2	0.05	F-2	0.09	G-1	99	○○	○○
Example 24	A-2	0.0001	0.0001	B-4	0.4499	C-3	0.05	D-3	0.09	E-3	0.4	F-3	0.01	G-1	99	○○	○○
Example 25	A-3	0.0005	0.00051	B-5	2.4995	C-4	0.75	D-4	0.025	E-4	0.975	F-4	0.75	G-1	95	○○	○○
Example 26	A-3	0.01	0.01	B-2	0.64			D-2	0.05	E-5 E-6	0.05 0.15	F-2	0.1	G-1	99	○○	○○
Example 27	A-1	0.01	0.01	B-6	0.2			D-5	0.05	E-7	0.69	F-5	0.05	G-1	99	○○	○○
Example 28	A-2	0.1	0.11	B-7	3.9			D-6	1	E-8	4	F-6	1	G-1	90	○○	○○
Example 29	A-2	0.3	0.34	B-2 B-8	2.7 11.7	C-1 C-5	1.2 2.7	D-1	6.3	E-2	0.6	F-7	4.5	G-1	70	○○	○○
Example 30	A-3	0.001	0.001	B-10	0.799	C-2	0.05	D-2	0.02	E-2	0.05	F-11	0.08	G-1	99	○○	○○
Example 31	A-1	0.01	0.01	B-7	0.7	C-4	0.05	D-6	0.05	E-5 E-9	0.05 0.05	F-9 F-10	0.06 0.03	G-1	99	○○	○○
Example 32	A-1	0.001	0.001	B-6	0.799	C-3	0.1	D-6	0.05	E-5	0.05			G-1	99	○	○○
Example 33	A-3	0.001	0.001	B-3	0.455	C-2	0.01	D-7	0.039	E-3	0.495			G-1	99	○	○○
Example 34	A-1	0.001	0.001	B-7	0.799	C-2	0.05	D-2 D-8	0.02 0.03	E-5	0.1			G-1	99	○	○○
Example 35	A-1	0.1	0.1	B-9	5	C-6	0.4	D-9	0.6	E-9	3.9			G-1	90	○	○○
Example 36	A-2	0.3	0.3	B-6	26.94	C-3	2.7	D-14	0.015	E-2	0.045			G-1	70	○	○○
Example 37	A-2	0.01	0.01	B-7	0.86			D-10	0.03	E-5	0.1			G-1	99	○	○○
Example 38	A-2	0.001	0.001	B-1 B-10	0.4 0.299	C-3	0.2					F-8	0.1	G-1	99	○	○

(continued)

Category	Aqueous liquid of viscose rayon nonwoven fabric treatment agent																Aqueous liquid appearance	Aqueous liquid foam test
	Zinc compound			Nonionic surfactant		Anionic surfactant		Fatty acid or fat or oil		Polyhydric alcohol		Lubricating oil		Water				
	Type	Amount used (%)	*2 Amount used (% by mass)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)	Type	Amount used (%)			
Example 39	A-3	0.01	0.01	B-3	0.89	C-2	0.1							G-1	99		○	○
Example 40	A-2	0.6	0.68	B-2 B-8	2.7 11.4	C-1 C-5	1.2 2.7	D-1	6.3	E-2	0.6	F-7	4.5	G-1	70		○	○○
Example 41	A-1	0.000001	0.000001	B-2 B-4	0.09 0.38	C-3	0.149999	D-1	0.21	E-2	0.02	F-7	0.15	G-1	99		○○	○
Example 42	A-1	0.01	0.01			C-3 C-6	0.35 0.05			E-2 E-5	0.2 0.2	F-1	0.19	G-1	99		○	○
Comparative Example 3				B-1	0.2	C-1	0.03	D-1	0.05	E-1	0.7	F-1	0.02	G-1	99		○○	×
Comparative Example 4	A-1	0.01	0.01					D-5	0.05	E-2	0.7	F-8	0.24	G-1	99		×	○○

[0095] Although the representations of components such as A-1 in Table 2 are the same as in Table 1, *2 represents the content of the zinc compound if the total content of the zinc compound, the surfactant, and water is taken as 100% by mass.

Experimental Part 4 (Evaluation of aqueous liquids)

(Evaluation tests)

[0096] Aqueous liquid appearance and aqueous liquid foam tests were performed using the aqueous liquids of Examples 22 to 42 and Comparative Examples 3 and 4. The evaluation methods and evaluation criteria are the same as in Experimental Part 2. The test results are shown in the "Aqueous liquid appearance" column and the "Aqueous liquid foam test" column of Table 2.

[0097] As is clear from the results in Table 2, the effect of suppressing the foaming of the aqueous liquid without degrading the appearance of the aqueous liquid is provided by the present invention.

[0098] The present invention also encompasses the following embodiments.

(Additional Embodiment 1)

[0099] A viscose rayon nonwoven fabric treatment agent includes a zinc compound and a surfactant.

(Additional Embodiment 2)

[0100] The viscose rayon nonwoven fabric treatment agent according to additional embodiment 1, wherein the surfactant includes at least one selected from among anionic surfactants and nonionic surfactants.

(Additional Embodiment 3)

[0101] The viscose rayon nonwoven fabric treatment agent according to additional embodiment 2, wherein the surfactant includes the nonionic surfactant and the nonionic surfactant includes at least one fatty acid derivative selected from among compounds with which an alkylene oxide with 2 to 4 carbon atoms is added at a ratio of 0.1 to 30 moles with respect to 1 mole of a fatty acid with 12 to 24 carbon atoms and ester compounds of 12 to 24 carbon atom fatty acid polyethylene glycols.

(Additional Embodiment 4)

[0102] The viscose rayon nonwoven fabric treatment agent according to any one of additional embodiments 1 to 3, wherein if the total content of the zinc compound and the surfactant is taken as 100% by mass, the zinc compound is contained at a ratio of 0.001% to 5% by mass.

(Additional Embodiment 5)

[0103] The viscose rayon nonwoven fabric treatment agent according to any one of additional embodiments 1 to 4, further comprising at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule.

[0104] Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

(Additional Embodiment 6)

[0105] The viscose rayon nonwoven fabric treatment agent according to any one of additional embodiments 1 to 5, further comprising at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

(Additional Embodiment 7)

[0106] The viscose rayon nonwoven fabric treatment agent according to additional embodiment 6, wherein the zinc compound is contained in the treatment agent at a ratio of 0.001% to 1% by mass.

(Additional Embodiment 8)

[0107] A viscose rayon to which the viscose rayon nonwoven fabric treatment agent according to any one of additional embodiments 1 to 7 is adhered.

(Additional Embodiment 9)

[0108] An aqueous liquid of viscose rayon nonwoven fabric treatment agent comprising a viscose rayon nonwoven fabric treatment agent that contains a surfactant and comprising a zinc compound and water.

(Additional Embodiment 10)

[0109] The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to additional embodiment 9, wherein the surfactant includes at least one selected from among anionic surfactants and nonionic surfactants.

(Additional Embodiment 11)

[0110] The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to additional embodiment 10, wherein the surfactant includes the nonionic surfactant and the nonionic surfactant includes at least one fatty acid derivative selected from among compounds with which an alkylene oxide with 2 to 4 carbon atoms is added at a ratio of 0.1 to 30 moles with respect to 1 mole of a fatty acid with 12 to 24 carbon atoms and ester compounds of a fatty acid with 12 to 24 carbon atoms and a polyethylene glycol.

(Additional Embodiment 12)

[0111] The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to any one of additional embodiments 9 to 11, wherein if the total content of the zinc compound, the surfactant, and water is taken as 100% by mass, the zinc compound is contained at a ratio of 0.00001% to 0.4% by mass.

(Additional Embodiment 13)

[0112] The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to any one of additional embodiments 9 to 12, further comprising at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule.

[0113] Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

(Additional Embodiment 14)

[0114] The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to any one of additional embodiments 9 to 13, further comprising at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

(Additional Embodiment 15)

[0115] The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to additional embodiment 14, wherein the zinc compound is contained in the aqueous liquid at a ratio of 0.00001% to 0.3% by mass.

(Additional Embodiment 16)

[0116] A viscose rayon to which the aqueous liquid of viscose rayon nonwoven fabric treatment agent according to any one of additional embodiments 9 to 15 is adhered.

(Additional Embodiment 17)

[0117] A method for manufacturing a viscose rayon for a nonwoven fabric, comprising adhering an aqueous liquid that contains a zinc compound and a surfactant to a viscose rayon.

(Additional Embodiment 18)

[0118] The method for manufacturing a viscose rayon for a nonwoven fabric according to additional embodiment 17, wherein the aqueous liquid further contains at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule.

[0119] Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

(Additional Embodiment 19)

[0120] The method for manufacturing a viscose rayon for a nonwoven fabric according to additional embodiment 18, wherein the aqueous liquid further contains at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

(Additional Embodiment 20)

[0121] The method for manufacturing a viscose rayon for a nonwoven fabric according to additional embodiment 19, wherein the zinc compound is contained in the aqueous liquid at a ratio of 0.00001% to 0.3% by mass.

(Additional Embodiment 21)

[0122] The method for manufacturing a viscose rayon for a nonwoven fabric according to additional embodiment 19 or 20, wherein the zinc compound, the surfactant, the polyhydric alcohol, the lubricating oil, and the at least one selected from among the fatty acids and the oils and fats are adhered such as to be 0.01% to 1.0% by mass in total with respect to the viscose rayon.

Claims

1. A viscose rayon (excluding a deodorant regenerated cellulose fiber with which a carboxylic-group-containing polymer is contained in the cellulose fiber) nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) comprising a zinc compound and a surfactant.

2. A viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) comprising a zinc compound, a surfactant, at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats, and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule.
   Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

3. A viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) comprising a zinc compound, a surfactant, and at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

4. The viscose rayon nonwoven fabric treatment agent according to any one of claims 1 to 3, wherein the surfactant includes at least one selected from among anionic surfactants and nonionic surfactants.

5. A viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) comprising a zinc compound and at least an anionic surfactant as a surfactant.

6. The viscose rayon nonwoven fabric treatment agent according to claim 5, further comprising a nonionic surfactant.

7. The viscose rayon nonwoven fabric treatment agent according to claim 4 or 6, wherein the surfactant includes the nonionic surfactant and the nonionic surfactant includes at least one fatty acid derivative selected from among compounds with which an alkylene oxide with 2 to 4 carbon atoms is added at a ratio of 0.1 to 30 moles with respect to 1 mole of a fatty acid with 12 to 24 carbon atoms and ester compounds of 12 to 24 carbon atom fatty acid polyethylene glycols.

8. The viscose rayon nonwoven fabric treatment agent according to any one of claims 1, 5, and 6, wherein if the total content of the zinc compound and the surfactant is taken as100% by mass, the zinc compound is contained at a ratio of 0.001% to 5% by mass.

9. The viscose rayon nonwoven fabric treatment agent according to any one of claims 1, 3, and 5, further comprising at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule.
Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

10. The viscose rayon nonwoven fabric treatment agent according to claim 1 or 5, further comprising at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

11. The viscose rayon nonwoven fabric treatment agent according to claim 3 or 10, wherein the zinc compound is contained in the treatment agent at a ratio of 0.001% to 1% by mass.

12. A viscose rayon to which the viscose rayon nonwoven fabric treatment agent according to any one of claims 1 to 11 is adhered.

13. An aqueous liquid of viscose rayon (excluding a deodorant regenerated cellulose fiber with which a carboxylic-group-containing polymer is contained in the cellulose fiber) nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) comprising a viscose rayon nonwoven fabric treatment agent that contains a surfactant and comprising a zinc compound and water.

14. An aqueous liquid of viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) comprising a viscose rayon nonwoven fabric treatment agent that contains a surfactant, at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats, and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule and comprising a zinc compound and water.
Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

15. An aqueous liquid of viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) comprising a viscose rayon nonwoven fabric treatment agent that contains a surfactant and at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones and comprising a zinc compound and water.

16. The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to any one of claims 13 to 15, wherein the surfactant includes at least one selected from among anionic surfactants and nonionic surfactants.

17. An aqueous liquid of viscose rayon nonwoven fabric treatment agent (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) comprising a viscose rayon nonwoven fabric treatment agent that contains at least an anionic surfactant as a surfactant and comprising a zinc compound and water.

18. The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to claim 17, further comprising a nonionic surfactant.

19. The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to claims 16 or 18, wherein the surfactant includes the nonionic surfactant and the nonionic surfactant includes at least one fatty acid derivative selected from among compounds with which an alkylene oxide with 2 to 4 carbon atoms is added at a ratio of 0.1 to 30 moles with respect to 1 mole of a fatty acid with 12 to 24 carbon atoms and ester compounds of a fatty acid with 12 to 24 carbon atoms and a polyethylene glycol.

20. The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to any one of claims 13, 17, and 18, wherein if the total content of the zinc compound, the surfactant, and water is taken as 100% by mass, the zinc compound is contained at a ratio of 0.00001% to 0.4% by mass.

21. The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to any one of claims 13, 15, and

17, further comprising at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule.
Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

22. The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to claim 13 or 17, further comprising at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

23. The aqueous liquid of viscose rayon nonwoven fabric treatment agent according to claim 15 or 22, wherein the zinc compound is contained in the aqueous liquid at a ratio of 0.00001% to 0.3% by mass.

24. A viscose rayon to which the aqueous liquid of viscose rayon nonwoven fabric treatment agent according to any one of claims 13 to 23 is adhered.

25. A method for manufacturing a viscose rayon (excluding a deodorant regenerated cellulose fiber with which a carboxylic-group-containing polymer is contained in the cellulose fiber) for a nonwoven fabric, comprising adhering an aqueous liquid (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) that contains a zinc compound and a surfactant to a viscose rayon.

26. A method for manufacturing a viscose rayon for a nonwoven fabric, comprising adhering an aqueous liquid (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) that contains a zinc compound, a surfactant, at least one selected from among fatty acids with 12 to 24 carbon atoms and the following oils and fats, and a polyhydric alcohol having 2 to 6 hydroxyl groups in the molecule to a viscose rayon.
Oils and fats: at least one selected from among vegetable oils, animal oils, and hydrogenated oils thereof.

27. A method for manufacturing a viscose rayon for a nonwoven fabric, comprising adhering an aqueous liquid (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) that contains a zinc compound, a surfactant, and at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones to a viscose rayon.

28. A method for manufacturing a viscose rayon for a nonwoven fabric, comprising adhering an aqueous liquid (excluding a shading composition containing a sulfonated Zn phthalocyanine compound with a mono azo dye bonded thereto) that contains a zinc compound and at least an anionic surfactant as a surfactant to a viscose rayon.

29. The method for manufacturing a viscose rayon for a nonwoven fabric according to claim 26, wherein the aqueous liquid further contains at least one lubricating oil selected from among hydrocarbon compounds, esters, and silicones.

30. The method for manufacturing a viscose rayon for a nonwoven fabric according to claim 29, wherein the zinc compound is contained in the aqueous liquid at a ratio of 0.00001% to 0.3% by mass.

31. The method for manufacturing a viscose rayon for a nonwoven fabric according to claim 29 or 30, wherein the zinc compound, the surfactant, the polyhydric alcohol, the lubricating oil, and the at least one selected from among the fatty acids and the oils and fats are adhered such as to be 0.01% to 1.0% by mass in total with respect to the viscose rayon.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/014715

A. CLASSIFICATION OF SUBJECT MATTER

D06M 101/06(2006.01)n; ***D06M 13/148***(2006.01)i; ***D06M 13/188***(2006.01)i; ***D06M 13/224***(2006.01)i; ***D06M 15/53***(2006.01)i; ***D06M 15/643***(2006.01)i
FI: D06M13/188; D06M15/53; D06M13/224; D06M13/148; D06M15/643; D06M101:06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06M101/06; D06M13/148; D06M13/188; D06M13/224; D06M15/53; D06M15/643

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2021
Registered utility model specifications of Japan 1996-2021
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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

JSTPlus/JST7580 (JDreamIII); CAplus/REGISTRY (STN); Japio-GPG/FX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 June 2021	**06 July 2021**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/014715

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