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(54) **METHOD FOR PREPARING CELLULOSE-POLYVINYL ALCOHOL FABRIC WITH IMPROVED SURFACE CHARACTERISTICS, CELLULOSE-POLYVINYL ALCOHOL FABRIC WITH IMPROVED SURFACE CHARACTERISTICS PREPARED THEREBY, AND FABRIC FOR WOUND HEALING COMPRISING SAME**

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(57) **ABSTRACT**

Disposed are a method for preparing cellulose-polyvinyl alcohol fabric with improved surface characteristics, cellulose-polyvinyl alcohol fabric with improved surface characteristics prepared thereby, and fabric for wound healing comprising same. The method for preparing cellulose-polyvinyl alcohol fabric with improved surface characteristics comprises, after preparing a composite including a cellulose-based polymer and a polyvinyl alcohol-based polymer, exposing the composite to an alkali solution. The cellulose-polyvinyl alcohol fabric with improved surface characteristics is prepared using the method for preparing cellulose-polyvinyl alcohol fabric with improved surface characteristics. The fabric for wound healing includes the cellulose-polyvinyl alcohol fabric with improved surface characteristics.

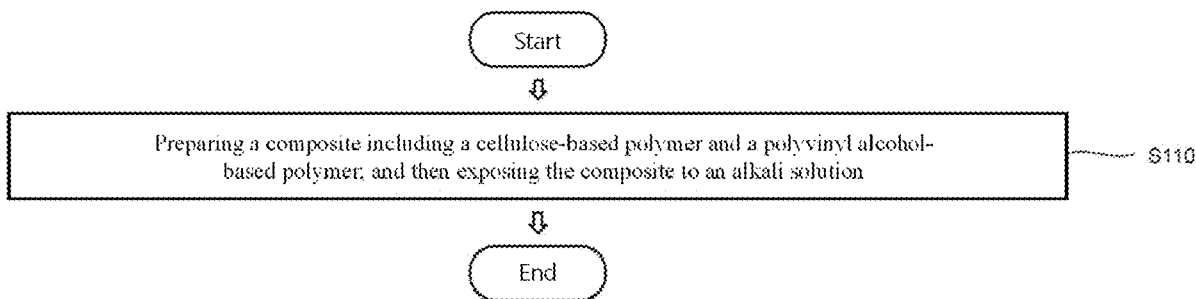
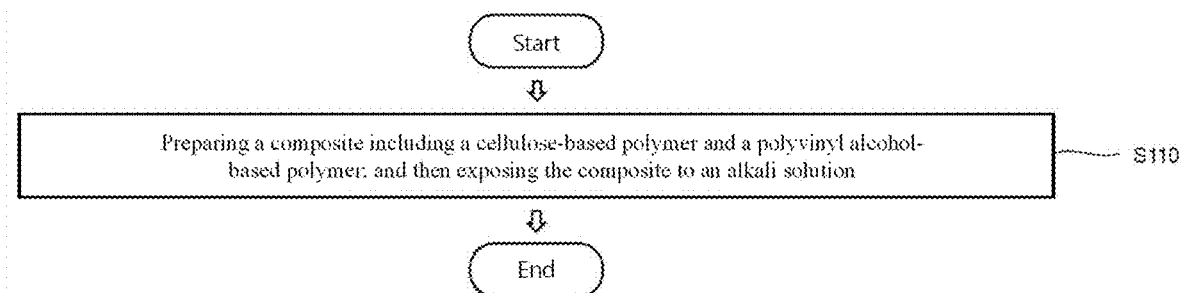


FIG. 1



**METHOD FOR PREPARING
CELLULOSE-POLYVINYL ALCOHOL
FABRIC WITH IMPROVED SURFACE
CHARACTERISTICS,
CELLULOSE-POLYVINYL ALCOHOL
FABRIC WITH IMPROVED SURFACE
CHARACTERISTICS PREPARED THEREBY,
AND FABRIC FOR WOUND HEALING
COMPRISING SAME**

BACKGROUND

Field of the Disclosure

[0001] The present disclosure relates to a method for preparing a cellulose-polyvinyl alcohol fabric with improved surface properties, a cellulose-polyvinyl alcohol fabric with improved surface properties prepared using the same, and a wound healing fabric including the same.

Description of Related Art

[0002] Polyvinyl alcohol (PVA) is a polymer with excellent physical strength. Fibers or membranes prepared so as to include the PVA exhibit high tensile strength, tensile modulus, abrasion resistance, alkali resistance, oxygen barrier properties, and biocompatibility. It is impossible to obtain such PVA via direct polymerization of vinyl alcohol due to the isomerization phenomenon, and may be obtained by preparing a vinyl ester-based polymer as a precursor and then saponifying the same.

[0003] Cellulose is the most abundant polymer material available in nature and has many advantages such as excellent mechanical strength and biodegradability. Nanocellulose obtained from cellulose is an ultrafine fiber with a diameter of only nanoscale, and its potential for use is endless. The application of nanocellulose to polymer composite may greatly improve the mechanical strength of polymers in a much more efficient way than may be achieved in the existing micro world. The nanocellulose may be widely used in edible and pharmaceutical packaging materials due to its low air permeability, excellent mechanical properties, and transparent optical properties. Additionally, due to its low thermal expansion coefficient and high strength, the nanocellulose has high potential for use in separators for lithium-ion batteries, displays, solar cells, electronic paper, and sensors.

[0004] The inventor of the present disclosure has invented a method for preparing cellulose-polyvinyl alcohol composite that may include all the advantages of the polyvinyl alcohol and the cellulose as described above.

SUMMARY OF THE INVENTION

[0005] A purpose of the present disclosure is to provide a method for preparing a cellulose-polyvinyl alcohol fabric with improved surface properties that may produce a fabric with excellent biocompatibility, excellent mechanical strength, and improved specific surface area.

[0006] Another purpose of the present disclosure is to provide a cellulose-polyvinyl alcohol fabric with improved surface properties prepared using the above method.

[0007] Still another purpose of the present disclosure is to provide a wound healing fabric including the above fabric.

[0008] One aspect of the present disclosure provides a method for preparing a cellulose-polyvinyl alcohol fabric

with improved surface properties, the method comprising: preparing a composite including a cellulose-based polymer and a polyvinyl alcohol-based polymer; and then exposing the composite to an alkali solution.

[0009] Through the exposure of the composite to the alkali solution, the cellulose-based polymer included in the composite may be mercerized, and the polyvinyl alcohol-based polymer included in the composite may be saponified.

[0010] The composite may be formed by coating the polyvinyl alcohol-based polymer on a surface of a structure including the cellulose-based polymer.

[0011] The coating of the polyvinyl ester polymer the structure including the cellulose-based polymer may include impregnating the structure including the cellulose-based polymer with a solution containing the polyvinyl alcohol-based polymer.

[0012] The fabric prepared using the above method may have improved mechanical strength after the mercerization of the cellulose-based polymer and may have enhanced surface properties after saponification of the polyvinyl alcohol-based polymer.

[0013] The cellulose-based polymer may include at least one of cotton, flax, linen, ramie, hemp, jute, kapok, sisal, manila, coir, or lyocell.

[0014] The cellulose-based polymer as described above may be exposed to the alkali solution and undergo the mercerization.

[0015] The planar density of the structure including the cellulose-based polymer may be in a range of 1 to 500 g/m².

[0016] The polyvinyl alcohol-based polymer may include at least one of polyvinyl acetate, polyvinyl pivalate, polyvinyl butyrate, polyvinyl trifluoroacetate, polyvinyl trichloroacetate, or polyvinyl propionate, or copolymers thereof.

[0017] The polyvinyl alcohol-based polymer as described above may be exposed to the alkali solution and may undergo the saponification.

[0018] The alkali solution may include at least one of sodium chloride, sodium sulfate, or methanol.

[0019] The alkali solution may contain distilled water and sodium chloride, wherein the sodium chloride may be contained in a range of 50 to 500 g per 1 L of the distilled water.

[0020] In the concentration range of the alkali solution described above, the mercerization of the cellulose-based polymer and the saponification of the polyvinyl alcohol-based polymer may be performed such that the mechanical strength and biocompatibility of the fabric may be maintained.

[0021] The alkali solution may further contain at least one of a dispersant or a swelling agent.

[0022] The dispersant may include at least one of sodium sulfate, sodium sulfite, calcium sulfate, or magnesium sulfate.

[0023] The swelling agent may include at least one of methanol, ethanol, propanol, ethylene glycol, propylene glycol, tetrahydrofuran (THF), dimethyl sulfoxide (DMSO), benzene, or acetone.

[0024] The fabric prepared using the method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties may have nano-sized curves on a surface thereof.

[0025] The nano-sized curves as described above may improve the surface properties, such as increasing the specific surface area of the fabric manufactured by the method for manufacturing the fabric according to the embodiment of the present disclosure.

[0026] Another aspect of the present disclosure provides a cellulose-polyvinyl alcohol fabric with improved surface properties prepared using the method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties as described above, wherein the cellulose-polyvinyl alcohol fabric with improved surface properties has a degree of saponification of 60 to 99.9%.

[0027] The cellulose-polyvinyl alcohol fabric with improved surface properties has nano-sized curves on a surface thereof.

[0028] The surface properties of the cellulose-polyvinyl alcohol fabric as described above may be improved, such as an increase in the specific surface area due to the nano-sized curves.

[0029] Still another aspect of the present disclosure provides a wound healing fabric including the cellulose-polyvinyl alcohol fabric with improved surface properties as described above, wherein when a skin wound may be closed with the fabric, a wound healing effect may be improved.

[0030] The cellulose-polyvinyl alcohol fabric with a large specific surface area and the improved mechanical strength may be prepared through the method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties according to an embodiment of the present disclosure.

[0031] The cellulose-polyvinyl alcohol fabric according to an embodiment of the present disclosure has a large specific surface area, improved mechanical strength, and excellent biocompatibility.

[0032] The wound healing fabric according to an embodiment of the present disclosure has excellent biocompatibility. The wound healing effect of the fabric is improved when the skin wound is closed with the fabric.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] FIG. 1 is a flowchart showing a method for preparing a cellulose-polyvinyl alcohol fabric with improved surface properties according to an embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE INVENTION

[0034] Hereinafter, an embodiment of the present disclosure will be described in detail with reference to the accompanying drawings. The present disclosure may be variously modified and may take many forms. Thus, specific embodiments will be illustrated in the drawings and described in detail herein. However, the specific embodiments are not intended to limit the present disclosure thereto. It should be understood that all changes, equivalents thereto, or substitutes therewith are included in a scope and spirit of the present disclosure. In describing the drawing, similar reference numerals are used for similar components. In the attached drawings, the dimensions of the structures are enlarged from the actual size to ensure clarity of the present disclosure.

[0035] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the present disclosure. As used herein, the singular forms “a” and “an” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises”, “comprising”, “includes”, and “including”

when used in this specification, specify the presence of the stated features, integers, operations, elements, and/or components, but do not preclude the presence or addition of one or greater other features, integers, operations, elements, components, and/or portions thereof.

[0036] Unless otherwise defined, all terms including technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this inventive concept belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0037] FIG. 1 is a flowchart showing a method for preparing a cellulose-polyvinyl alcohol fabric with improved surface properties according to an embodiment of the present disclosure.

[0038] Referring to FIG. 1, the method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties according to an embodiment of the present disclosure includes preparing a composite including a cellulose-based polymer and a polyvinyl alcohol-based polymer, and then exposing the composite to an alkali solution in S110.

[0039] In the context of the present disclosure, the term “fabric” means any article prepared using arranging and processing fibers, whether or not woven. Non-limiting examples of fabric may include a non-woven fabric.

[0040] In one embodiment, the cellulose-based polymer included in the composite may be mercerized through exposure of the composite to the alkali solution. In the context of the present disclosure, “mercerization” or “mercerization reaction” refers to a reaction in which the strong hydrogen bonds between fiber molecules are removed by exposing the fiber molecules to a base such that solutions or water may easily penetrate a gap between the fiber molecules. Through the mercerization, the fiber fabric may have improved absorbency and dyeability, or increased transparency or gloss.

[0041] In one embodiment, the polyvinyl alcohol-based polymer included in the composite may be saponified through exposure of the composite to the alkali solution. “Saponification” or “saponification reaction” in the context of the present disclosure means a reaction of converting an ester functional group into a hydroxyl functional group. In one example, the conversion may be achieved, for example, via hydrolysis. Furthermore, the saponification reaction may be promoted by acid or base catalysts. In one embodiment, the saponification reaction may be performed using an alkali solution.

[0042] In the context of the present disclosure, “saponification” includes “non-uniform saponification”. In the context of the present disclosure, “heterogeneous saponification” means that the polymer is saponified so that the degree of saponification of the entirety of the polymer and the degree of saponification of a portion of the polymer are different from each other, or the degrees of saponification of the first portion and the second portion are different from each other. In one example, when saponifying a polymer in a solid state, amounts of the inner and outer portions thereof exposed to the saponification solution respectively are different from each other such that the degrees of saponifica-

tion of the inner and outer portions may be different from each other. This is one example of the non-uniform saponification.

[0043] A method for preparing the composite including the cellulose-based polymer and the polyvinyl alcohol-based polymer or a structure of the composite is not particularly limited. The composite may be a blend of a cellulose-based polymer and a polyvinyl alcohol-based polymer, or may have a structure in which a polyvinyl alcohol-based polymer is coated on a cellulose-based polymer, or vice versa. In one embodiment, the composite may be prepared using coating the polyvinyl alcohol-based polymer on a surface of a structure including the cellulose-based polymer.

[0044] A method for coating the polyvinyl ester polymer on the surface of the structure including the cellulose-based polymer to form the composite is not particularly limited. Non-limiting examples thereof may include a spin coating method or an impregnation method. In one embodiment, the coating of the polyvinyl ester polymer on the structure including the cellulose-based polymer may include impregnating the structure with a solution containing the polyvinyl alcohol-based polymer.

[0045] In the context of the present disclosure, “cellulose” or “cellulose-based polymer” refers, as will be readily apparent to those skilled in the art, to a type of vegetable fibers and includes glycosidic bonds of glucose. In one embodiment, the cellulose-based polymer may include one or more of cotton, flax, linen, ramie, hemp, jute, kapok, sisal, manila hemp, coir, or lyocell.

[0046] The structure including the cellulose-based polymer is not particularly limited in terms of a structure, a size, and a shape as long as it may achieve the purpose of the present disclosure. In one embodiment, the structure including the cellulose-based polymer may be a film-shaped planar structure. In this case, in one embodiment, a planar density of the structure including the cellulose-based polymer may be in a range of 1 to 500 g/m². In the context of the present disclosure, “planar density” means a weight per a predefined area of the planar structure. When the planar density is high, the planar structure may be dense or thick. In an embodiment of the present disclosure, when the planar density of the structure including the cellulose-based polymer is low, it may be difficult to maintain the shape of the structure. Conversely, when the planar density of the structure is high, mercerization may not be achieved sufficiently. Those skilled in the art may select the planar density of the structure including the cellulose-based polymer within a range in which the purpose of the present disclosure may be achieved.

[0047] In the context of the present disclosure, “polyvinyl ester” or “polyvinyl alcohol-based polymer” is a polymerized polymer of vinyl ester, as will be apparent to those skilled in the art. Within the purpose of the present disclosure, a type of the polymer is not particularly limited as long as the polymer may undergo the saponification through the exposure to the alkali solution. In one embodiment, the polyvinyl alcohol-based polymer may include at least one of polyvinyl acetate, polyvinyl pivalate, polyvinyl butyrate, polyvinyl trifluoroacetate, polyvinyl trichloroacetate, or polyvinyl propionate, or copolymers thereof.

[0048] In the exposure step of S110, the alkali solution is a solution that may achieve the mercerization of the cellulose-based polymer and the saponification of the polyvinyl alcohol-based polymer. Thus, the type of the alkali solution

is not particularly limited as long as it is able to perform this function. In one embodiment, the alkali solution may include one or more of sodium chloride, sodium sulfate, or methanol.

[0049] In the exposure step of S110, a method of exposing the composite to the alkali solution is not particularly limited. The method that may be selected by those skilled in the art may include, but are not limited to, one or more of vapor exposure, spraying, or impregnation.

[0050] As described above, the alkali solution is a solution that may achieve the mercerization of the cellulose-based polymer and the saponification of the polyvinyl alcohol-based polymer, and acts as a reactant of the mercerization and a catalyst for the saponification. Therefore, a concentration of the alkali solution may be controlled such that a mercerization amount of the cellulose-based polymer and a saponification amount and speed of the polyvinyl alcohol-based polymer may be adjusted. A person skilled in the art may select the concentration of the alkali solution depending on a target amount of each of the mercerization and the saponification. In one embodiment, the alkali solution may contain distilled water and sodium chloride, and the sodium chloride may be contained at 50 to 500 g per 1 L of the distilled water. In the concentration range of the alkali solution as described above, the mercerization of the cellulose-based polymer and the saponification of the polyvinyl alcohol-based polymer may be performed such that the mechanical strength and biocompatibility of the fabric may be maintained.

[0051] As described above, the alkali solution is a solution that may achieve the mercerization of the cellulose-based polymer and the saponification of the polyvinyl alcohol-based polymer. Thus, it is not excluded that the alkali solution may further contain another material as long as it performs the above function. In one embodiment, the alkali solution may further contain one or more of a dispersing agent (dispersant) or a swelling agent. For example, the dispersant may include one or more of sodium sulfate, sodium sulfite, calcium sulfate, or magnesium sulfate. For example, the swelling agent may include one or more of methanol, ethanol, propanol, ethylene glycol, propylene glycol, tetrahydrofuran (THF), dimethyl sulfoxide (DMSO), benzene, or acetone.

[0052] The fabric prepared using the method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties according to an embodiment of the present disclosure may have improved surface properties. In the context of the present disclosure, “improvement in surface properties” may have one or more of following meanings: “roughening,” “increasing specific surface area,” or “activating the surface,” as readily interpreted by a person skilled in the art. In one embodiment, the fabric may have nano-sized curves on its surface. Due to the nano-sized curves, the fabric according to an embodiment of the present disclosure becomes rough, the specific surface area thereof increases, and the surface thereof becomes activated.

[0053] In another aspect of the present disclosure, the cellulose-polyvinyl alcohol fabric with improved surface properties is provided, which is prepared through the method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties and has a degree of saponification of 60 to 99.9%. In one embodiment, the cellulose-polyvinyl alcohol fabric with improved surface properties may have nano-sized curves on its surface.

[0054] In another aspect of the present disclosure, a wound healing fabric is provided, including the cellulose-polyvinyl alcohol fabric with improved surface properties, wherein a wound healing effect is improved when a wound on the skin is closed with the fabric. The wound healing fabric includes the cellulose-polyvinyl alcohol fabric with improved surface properties, and has excellent biocompatibility. As described above, the specific surface area of the fabric increases, thereby improving wound healing ability.

[0055] Hereinafter, examples of the present disclosure are described in detail. However, the examples as described below are only some embodiments of the present disclosure, and the scope of the present disclosure is not limited to the examples as set forth below. [Present Example 1-1] Cellulose-polyvinyl ester composite preparation

[0056] 6% by weight polyvinyl acetate was added to 37.92 ml of purity 99% methanol solvent, followed by stirring at 50° C. for 30 minutes, and followed by stabilization for 1 hour. Thus, a polyvinyl acetate solution was prepared and then was dried at room temperature for one hour. Cellulose cotton fabric was impregnated with the polyvinyl acetate solution and coated therewith. As a result, a cellulose-polyvinyl ester composite was prepared.

[Present Example 1-2] Cellulose-Polyvinyl Ester Composite Preparation

[0057] A cellulose-polyvinyl ester composite was prepared using the method according to Present Example 1-1, except that polyvinyl acetate was added at 8% by weight.

[Present Example 1-3] Cellulose-Polyvinyl Ester Composite Preparation

[0058] A cellulose-polyvinyl ester composite was prepared using the method according to Present Example 1-1, except that polyvinyl acetate was added at 10% by weight.

[0059] A composite preparation condition according to each Present Example is shown in a table as set forth below.

TABLE 1

Example	Polymer	Polymer concentration
Present Example 1-1	Polyvinyl acetate	6 wt %
Present Example 1-2	Polyvinyl acetate	8 wt %
Present Example 1-3	Polyvinyl acetate	10 wt %

[Present Example 2-1] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0060] The composite prepared through Present Example 1-2 was prepared. For mercerization and saponification, an alkali solution was prepared by mixing 100 mL of distilled water, 10 g of NaOH, 10 g of Na₂SO₄, and 10 g of MeOH with each other, followed by stirring. The prepared composite was impregnated with the prepared alkali solution, such that saponification and mercerization were simultaneously performed at 50° C. for 24 hours. Afterwards, the composite was washed with distilled water and dried at room temperature for 12 hours to prepare a cellulose-polyvinyl alcohol fabric according to Present Example 2-1 of the present disclosure.

[Present Example 2-2] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0061] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 2-1, except that the composite was impregnated with the prepared alkali solution at 50° C. for 48 hours to undergo saponification and mercerization.

[Present Example 2-3] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0062] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 2-1, except that the composite was impregnated with the prepared alkali solution at 50° C. for 72 hours to undergo saponification and mercerization.

[Present Example 2-4] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0063] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 2-1, except that the composite was impregnated with the prepared alkali solution at 50° C. for 96 hours to undergo saponification and mercerization.

[Present Example 2-5] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0064] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 2-1, except that the composite was impregnated with the prepared alkali solution at 50° C. for 120 hours to undergo saponification and mercerization.

[Present Example 2-6] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0065] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 2-1, except that the composite was impregnated with the prepared alkali solution at 40° C. for 24 hours to undergo saponification and mercerization.

[Present Example 2-7] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0066] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 2-1, except that the composite was impregnated with the prepared alkali solution at 40° C. for 48 hours to undergo saponification and mercerization.

[Present Example 2-8] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0067] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 2-1, except that the composite was impregnated with the prepared alkali solution at 40° C. for 72 hours to undergo saponification and mercerization.

[Present Example 2-9] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0068] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 2-1, except that

the composite was impregnated with the prepared alkali solution at 40° C. for 96 hours to undergo saponification and mercerization.

[Present Example 2-10] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0069] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 2-1, except that the composite was impregnated with the prepared alkali solution at 40° C. for 120 hours to undergo saponification and mercerization.

[0070] The saponification/mercerization reaction conditions according to each Present Example are shown in a table as set forth below.

TABLE 2

Example	Saponification/ mercerization reaction temperature	Saponification/ mercerization reaction time
Present Example 2-1	50° C.	24 hours
Present Example 2-2	50° C.	48 hours
Present Example 2-3	50° C.	72 hours
Present Example 2-4	50° C.	96 hours
Present Example 2-5	50° C.	120 hours
Present Example 2-6	40° C.	24 hours
Present Example 2-7	40° C.	48 hours
Present Example 2-8	40° C.	72 hours
Present Example 2-9	40° C.	96 hours
Present Example 2-10	40° C.	120 hours

[Present Example 3-1] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0071] The composite prepared through Present Example 1-2 was prepared. For mercerization and saponification, an alkali solution was prepared by mixing 100 mL of distilled water, 5 g of NaOH, 10 g of Na₂SO₄, and 10 g of MeOH with each other, followed by stirring. The prepared composite was impregnated with the prepared alkali solution such that saponification and mercerization were simultaneously performed at 50° C. for 120 hours. Afterwards, the composite was washed with distilled water and dried at room temperature for 12 hours to prepare a cellulose-polyvinyl alcohol fabric according to Present Example 3-1 of the present disclosure.

[Present Example 3-2] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0072] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 3-1, except that 10 g of NaOH was used.

[Present Example 3-3] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0073] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 3-1, except that 15 g of NaOH was used.

[Present Example 3-4] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0074] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 3-1, except that 20 g of NaOH was used.

[Present Example 3-5] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0075] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 3-1, except that 25 g of NaOH was used.

[Present Example 3-6] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0076] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 3-1, except that the composite was impregnated with the prepared alkali solution at 40° C. for 120 hours to undergo saponification and mercerization.

[Present Example 3-7] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0077] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 3-6, except that 10 g of NaOH was used.

[Present Example 3-8] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0078] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 3-6, except that 15 g of NaOH was used.

[Present Example 3-9] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0079] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 3-6, except that 20 g of NaOH was used.

[Present Example 3-10] Cellulose-Polyvinyl Alcohol Fabric Preparation

[0080] A cellulose-polyvinyl alcohol fabric was prepared in the same manner as in Present Example 3-6, except that 25 g of NaOH was used.

[0081] The saponification/mercerization reaction conditions according to each Present Example are shown in a table as set forth below.

TABLE 3

Example	Saponification/ mercerization reaction temperature	Saponification/ mercerization reaction time	NaOH amount
Present Example 3-1	50° C.	120 hours	5 g
Present Example 3-2	50° C.	120 hours	10 g
Present Example 3-3	50° C.	120 hours	15 g
Present Example 3-4	50° C.	120 hours	20 g
Present Example 3-5	50° C.	120 hours	25 g
Present Example 3-6	40° C.	120 hours	5 g
Present Example 3-7	40° C.	120 hours	10 g
Present Example 3-8	40° C.	120 hours	15 g
Present Example 3-9	40° C.	120 hours	20 g
Present Example 3-10	40° C.	120 hours	25 g

[Experimental Example] Degree of Saponification and Wound Healing Effect Analysis

[0082] The degree of saponification and the wound healing effect of the cellulose-polyvinyl alcohol fabric according

to each of Present Examples 3-1 to 3-10 were analyzed. The wound healing effect was analyzed over 10 days. The wound healing effect was analyzed for 10 days based on a size of the wound.

TABLE 4

Example	Degree of saponification	Wound healing effect (10 days)
Present Example 3-1	95.4%	0.147
Present Example 3-2	98.7%	0.156
Present Example 3-3	98.9%	0.843
Present Example 3-4	99.0%	1.642
Present Example 3-5	99.3%	2.865
Present Example 3-6	94.7%	0.211
Present Example 3-7	98.2%	0.247
Present Example 3-8	98.6%	1.156
Present Example 3-9	98.8%	2.352
Present Example 3-10	99.2%	2.843

[0083] Referring to Table 4 as set forth above, it may be identified that the cellulose-polyvinyl alcohol fabric prepared through the method for preparing the cellulose-polyvinyl alcohol fabric according to each of Present examples of the present disclosure has a significantly reduced degree of saponification at a low alkali concentration and the wound healing effect is increased.

[0084] Although the present disclosure has been described above with reference to preferred embodiments of the present disclosure, those skilled in the art may modify and change the present disclosure in various ways without departing from the spirit and scope of the present disclosure as set forth in the patent claims as set forth below.

1. A method for preparing a cellulose-polyvinyl alcohol fabric with improved surface properties, the method comprising:

preparing a composite including a cellulose-based polymer and a polyvinyl alcohol-based polymer; and then exposing the composite to an alkali solution.

2. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 1, wherein through the exposure of the composite to the alkali solution, the cellulose-based polymer included in the composite is mercerized, and the polyvinyl alcohol-based polymer included in the composite is saponified.

3. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 1, wherein the composite is formed by coating the polyvinyl alcohol-based polymer on a surface of a structure including the cellulose-based polymer.

4. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 3, wherein the coating of the polyvinyl ester polymer the structure including the cellulose-based polymer includes impregnating the structure including the cellulose-based polymer with a solution containing the polyvinyl alcohol-based polymer.

5. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 4,

wherein the cellulose-based polymer includes at least one of cotton, flax, linen, ramie, hemp, jute, kapok, sisal, manila, coir, or lyocell.

6. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 5, wherein a planar density of the structure including the cellulose-based polymer is in a range of 1 to 500 g/m².

7. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 1, wherein the polyvinyl alcohol-based polymer includes at least one of polyvinyl acetate, polyvinyl pivalate, polyvinyl butyrate, polyvinyl trifluoroacetate, polyvinyl trichloroacetate, or polyvinyl propionate, or copolymers thereof.

8. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 1, wherein the alkali solution includes at least one of sodium chloride, sodium sulfate, or methanol.

9. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 8, wherein the alkali solution contains distilled water and sodium chloride, wherein the sodium chloride is contained in a range of 50 to 500 g per 1 L of the distilled water.

10. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 1, wherein the alkali solution further contains at least one of a dispersant or a swelling agent.

11. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 10, wherein the dispersant includes at least one of sodium sulfate, sodium sulfite, calcium sulfate, or magnesium sulfate.

12. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 10, wherein the swelling agent includes at least one of methanol, ethanol, propanol, ethylene glycol, propylene glycol, tetrahydrofuran (THF), dimethyl sulfoxide (DMSO), benzene, or acetone.

13. The method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties of claim 1, wherein the fabric prepared using the method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties has nano-sized curves on a surface thereof.

14. A cellulose-polyvinyl alcohol fabric with improved surface properties prepared using the method for preparing the cellulose-polyvinyl alcohol fabric with improved surface properties according to claim 1, wherein the cellulose-polyvinyl alcohol fabric with improved surface properties has a degree of saponification of 60 to 99.9%.

15. The cellulose-polyvinyl alcohol fabric with improved surface properties of claim 14, wherein the cellulose-polyvinyl alcohol fabric with improved surface properties has nano-sized curves on a surface thereof.

16. A wound healing fabric including the cellulose-polyvinyl alcohol fabric with improved surface properties according to claim 14, wherein when a skin wound is closed with the fabric, a wound healing effect is improved.

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