An antimicrobial woven fabric having interwoven silver threads in manufacturing antimicrobial medical garments including tunics, gowns, coveralls, jackets, scrub tops, scrub pants, lab coats, footwear covers, linens, curtains and dividers wherein the woven fabric is selected from one or more of cotton, wool, silk, hemp, polyester, polypropylene, spandex and nylon, preferably the fabric is a blend of cotton and polyester fibers, with the medical garments providing for a garment closure, such as a zipper, extending approximately from a top front of the garment to a bottom front of the garment for opening said garment; and a plurality of pockets on a front portion of said garment.
ANTIMICROBIAL MEDICAL GARMENT

BACKGROUND OF THE INVENTION

[0001] Field of the Invention

[0002] The present invention relates generally to fabric and, more specifically, to an antimicrobial fabric using silver threads woven in combination with a cotton polyester fabric in manufacturing antimicrobial medical garments including tunics, gowns, coveralls, jackets, scrub tops, scrub pants, lab coats, footwear covers, linens, curtains and dividers.

[0003] In addition the medical garments may provide a garment closure, such as a zipper extending from the front top to the bottom whereby a user can remove the garment without exposing one’s face to the garment’s outer surface.

[0004] The application illustrates a specific embodiment of the invention, which is not intended to limit the invention in any manner.

[0005] Description of the Prior Art

[0006] There are other fabrics and garments designed for antimicrobial and medical use. Typical of these is U.S. Pat. No. 4,343,853 issued to Morrison on Aug. 10, 1982.

[0007] Another patent was issued to Osunni et al. on Apr. 11, 1995 as U.S. Pat. No. 5,405,644. Yet another U.S. Pat. No. 5,413,789 was issued to Higwara et al. on May 9, 1995 and still yet another was issued on Oct. 12, 1999 to Andrews et al. as U.S. Pat. No. 5,965,223.

[0008] Another patent was issued to Orma on Apr. 23, 2002 as U.S. Pat. No. 6,374,643. Yet another U.S. Pat. No. 6,495,320 was issued to Bernhardt on Dec. 31, 2002. Another was issued to Rock et al. on Aug. 5, 2003 as U.S. Pat. No. 6,602,811 and still yet another was issued on Jun. 19, 2007 to Van Huyning as U.S. Pat. No. 7,232,777.


[0010] A unique fabric construction having a backing fabric and a face fabric. At least one of the fabrics is made at least in part of yarns formed from synthetic fibers which have incorporated therein an antimicrobial agent. In some embodiments a tie yarn joins the two faces in plaited relation. Even with minimal contact of the yarns in the two fabrics, the antimicrobial agent migrates from within the treated fibers in the one fabric to the surface thereof and transfers to the yarns in the other fabric. Thus there is imparted antimicrobial protection to both fabrics while maintaining the advantages of naturally occurring, untreated fibers in one of the fabrics.

[0011] A process for producing an antimicrobial fiber having a silver-containing inorganic microbicide characterized by using a treating solution for producing said fiber which contains a discolored inhibitor represented by the following general formula: #STR1## wherein R.sup.1 is hydrogen or a lower alkyl group and R.sup.2 is hydrogen or an alkali metal.

[0012] The invention provides a novel antibacterial compound and a process for producing it. Furthermore, the invention provides a novel antibacterial polymer composite comprising a polymer and the antimicrobial composition.

[0013] The present invention is a composite layered protective fabric having an outer primary layer composed of an abrasive material and an inner primary layer composed of an inherently cut-resistant material positioned below the outer primary layer and when assembled into a garment is positioned proximate to the wearer’s skin. In another preferred embodiment of the present invention, a secondary layer is added to the inner and outer layer framework. The secondary layer is composed of a material that provides additional protection against potential threats other than cuts, that increases comfort or that improves aesthetics. The invention composite fabric is continuously manufactured in a one-step process which plates the layers of yarn. Thus formed, the invention composite fabric can be formed into cut-resistant apparel and articles that provide a high level of protection against sharp objects.

[0014] A thread and a fabric are provided which are capable of being dyed to have a desired color and are formed of a metal-plated yarn excellent in antibacterial and electro-magnetic shielding properties. The thread for achieving this object is a composite thread consisting of a chain stitch yarn formed of a dyeable yarn and a metal-plated yarn inserted as a core yarn into the chain stitch yarn. A fabric or a weft-knit product formed of the composite yarn is excellent in antibacterial and electro-magnetic shielding properties and capable of having a favorable appearance of desired color. If the metal-plated yarn is directly arranged in the warp-knit fabric, the metal-plated yarn is preferably inserted to be invisible to a human eye from the surface of the warp-knit fabric.

[0015] A garment device and its associated method of manufacture are claimed. The garment produced has an internal surface and an external surface, wherein the internal surface contacts a portion of the user’s skin. The garment is preferably fabricated from a knitted or woven material having at least one first yarn made from a conventional garment material and a second yarn that includes an active antimicrobial agent. The knit pattern is designed to cause the conventional garment material to be predominant on the exterior surface of the garment while the yarns containing the antimicrobial agent are predominant on the interior surface of the garment. The presence of the yarns with the active antimicrobial agent on the interior of the garment resists the microbial contamination of the interior of the garment. As a result, the length of time the garment can be worn without the adverse effects of contamination can be extended.

[0016] A composite textile fabric for removing moisture from the skin is provided. The composite fabric includes an inner, first fabric layer comprising either a polyester, polypropylene, acrylic or nylon yarn material which is naturally, or has been rendered, hydrophilic and an outer, second fabric layer incorporating either a moisture-absorbent material such as cotton or a synthetic yarn which has been rendered hydrophilic, or a combination thereof. The first and second fabric layers are formed concurrently by knitting a plaited construction. The second fabric layer, but not the first layer, is blended with synthetic fibers treated to have antimicrobial properties or the second fabric layer is treated with an anti-microbial paste. An elastomeric yarn material may be added to both layers so that the composite fabric is stretchable.

[0017] Durable silver particulate treatments for yarns and textile fabrics are provided. Such treatments provide, as one example, an antimicrobial fiber and/or textile fabric which remains on the surface and retains its antimicrobial characteristics after a substantial number of standard launderings and dryings. The method of adherence to the target yarn and/or fabric may be performed any number of ways, most preferably through the utilization of a binder system. The
particular method of adherence, as well as the treated textile fabrics and individual fibers are also encompassed within this invention.

[0018] An antibacterial composition including silver nano particles, a protective agent and water is provided. The molar ratio of the silver nano particles to the protective agent is 1.0:995-1 and the protective agent is selected from a group consisting of MCl, MBr, MI, MS2O8, and NH2OH, in which M represents an element of group IA or IA. Furthermore, two methods of fabricating an antibacterial textile are also provided.

PROBLEM TO BE SOLVED

[0019] To provide an antibacterial fibrous material capable of giving various net-like materials or woven cloths having an antibacterial property by giving flexibility to a fibrous material and knitting or weaving the material.

SOLUTION

[0020] This antibacterial fibrous material is made to one body by joining a flat filament made of copper and a flat filament having the same breadth and the same length with the copper filament made of a synthetic resin are laminated on the surface and the rear face of the flat filament made of copper and having ultrathin breadth by an adhesive. Therefore, the antibacterial fibrous material has excellent antibacterial property and also mechanical strength, and further net-like materials or woven cloths having an antibacterial property and mechanical strength are produced by knitting or weaving the fibrous material.

[0021] The utility model relates to an antimicrobial machine woven cloth, which relates to a cloth material, in particular to a machine woven shell fabric with antimicrobial efficacy at the surface. The utility model is characterized in that: longitude wires and latitude wires are interwoven together in a sinking and emerging pattern to form a plain weave cloth, a drills, a satin weave or a towel cloth. During the one to five weaving procedures, at least one piece of latitude wire or a longitude wire is made of silver coated fiber, a silver coated fiber long thread; or a mixed yarn is formed by short silver coated fiber, cotton fiber and/or chemical fiber. Due to the silver ions contained in the silver coated fiber, which has excellent sterilizing and germ reproduction restriction efficacy, therefore the utility model provides excellent sterilization, antimicrobial functions, and the silver ions are not easy to lose, providing long time antimicrobial efficacy, is in particular suitable to be applied as diaper, sanitary towel, shoe insole, ward sheet and shirt cloth etc.

[0022] While these fabrics may be suitable for the purposes for which they were designed, they would not be as suitable for the purposes of the present invention, as hereinafter described.

SUMMARY OF THE PRESENT INVENTION

[0023] A primary object of the present invention is to provide an antimicrobial fabric for use in manufacturing medical garments including tunics, gowns, coveralls, jackets, scrub tops, scrub pants, lab coats, footwear covers, linens, curtains and dividers.

[0024] Another object of the present invention is to provide an antimicrobial fabric comprising in combination a non-synthetic yarn, a synthetic yarn and silver thread.

[0025] Yet another object of the present invention is to provide an antimicrobial fabric wherein said non-synthetic yarn is cotton.

[0026] Still yet another object of the present invention is to provide an antimicrobial fabric wherein said synthetic yarn is a polymeric compound, preferably polyester.

[0027] An additional object of the present invention is to provide an antimicrobial fabric wherein said silver thread is interlaced within the cotton polyester fabric.

[0028] A further object of the present invention is to provide an antimicrobial fabric wherein said silver thread is not bonded to the cotton polyester yarns.

[0029] Yet another object of the present invention is to provide an antimicrobial medical garment incorporating one or more fasteners as closure of said garment after donning said garment.

[0030] A still further object of the present invention is to provide an antimicrobial medical garment wherein said fasteners is selected from the group of buttons, snaps, hook and eye, Velcro® (hook and loop type fasteners) and zipper.

[0031] Another object of the present invention is to provide an antimicrobial medical garment having a fastener extending the length of the garment.

[0032] Yet another object of the present invention is to provide an antimicrobial medical garment wherein said fastener is a zipper.

[0033] Yet another object of the present invention is to provide antimicrobial medical garments having one or more pockets.

[0034] Additional objects of the present invention will appear as the description proceeds.

[0035] The present invention overcomes the shortcomings of the prior art by providing an antimicrobial fabric using silver threads woven into a cotton polyester blend fabric in manufacturing antimicrobial medical garments including tunics, gowns, coveralls, jackets, scrub tops, scrub pants, lab coats, footwear covers, linens, curtains and dividers.

[0036] Also provided are medical garments incorporating fasteners, such as a zipper, extending from the front top to the bottom whereby a user can remove the garment without exposing one's face to the garment's outer surface.

[0037] The foregoing and other objects and advantages will appear from the description to follow. In the description reference is made to the accompanying drawing figures, which form a part hereof, and in which is shown by way of illustration specific embodiments by which the invention may be practiced. These embodiments will be described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that structural changes may be made without departing from the scope of the invention. In the accompanying drawings, like reference characters designate the same or similar parts throughout the several views.

[0038] The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is best defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0039] In order that the invention may be more fully understood, it will now be described, by way of example, with reference to the accompanying drawings in which:

[0040] FIG. 1 is an illustrative view of the prior art of the present invention.
FIG. 2 is another illustrative view of the prior art of the present invention.

FIG. 3 is a front view of the medical garment of the present invention.

FIG. 4 is a front view of the closed medical garment of the present invention.

FIG. 5 is a front view of the medical garment of the present invention in use.

FIG. 6 is a front view of the closed medical garment of the present invention in use.

FIG. 7 is an enlarged view of the antimicrobial fabric of the present invention.

FIG. 8 is an illustrative view of the present invention.

DESCRIPTION OF THE REFERENCED NUMERALS

10 user
12 prior art medical garment
14 head of 10
16 face on 14
18 head hole of 12
20 outer front surface of 12
22 Antimicrobial Medical Garment of the present invention
24 antimicrobial fabric
26 zipper
28 top front portion of 22
30 bottom front portion of 22
32 pockets on 22
34 front portion of 22
36 fabric
38 silver threads
40 medical scrub
42 cloth

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The following discussion describes in detail one or more embodiments of the invention. This discussion should not be construed, however, as limiting the invention to those particular embodiments, practitioners skilled in the art will recognize numerous other embodiments as well. For definition of the complete scope of the invention, the reader is directed to appended claims.

FIG. 1 is an illustrative view of the prior art of the present invention. Shown is a user 10 wearing a standard medical garment 12, for example, a medical scrub, of unitary construction having no frontal opening and which can be removed only by pulling the garment over the user’s 10 head 14 and face 16 through the garment’s 12 head hole 18 that can expose the user 10 to contamination of their skin surfaces and air passages by bacteria and viruses resident on the garment 12.

FIG. 2 is another illustrative view of the prior art of the present invention. Shown is a user 10 attempting the awkward and potentially contaminative maneuver of removing a standard medical garment 12, for example, a medical scrub, by pulling the garment 12 over the user’s 10 head 14, thus exposing the user’s face 16 to contamination of their skin surfaces and air passages by bacteria and viruses resident on the garment 12 as they draw the garment’s 12 outer front surface 20, the portion of the garment most likely to be contaminated, past their face 16 as they pull their head 14 through the garment’s 12 head hole 18.

FIG. 3 is a front view of one illustrative embodiment of the present invention depicting an antimicrobial medical garment 22 of the present invention in a partially closed orientation. The antimicrobial medical garment 22 is formed of an antimicrobial fabric 24, for example, as a medical scrub, and includes a fastener for opening and closing the garment whereby a user can remove the garment 22 without exposing one’s face to the garment’s outer surface. The fastener can be, for example, a zipper, hook and eye fasteners, hook and loop type fasteners (Velcro®), snaps, buttons and the like. Preferably, the fastener is a zipper 26 extending from the top front 28 of the garment 22 to the bottom front 30 of the garment 22. Optionally, the garment 22 further includes a plurality of pockets 32, preferably on the front portion 34 of the garment 22.

FIG. 4 is a front view of the antimicrobial medical garment 22 of the present invention in a closed orientation. The antimicrobial medical garment 22 is formed of an antimicrobial fabric 24, for example, as a medical scrub, and includes a fastener for opening and closing the garment whereby a user can remove the garment 22 without exposing one’s face to the garment’s outer surface. The fastener can be, for example, a zipper, hook and loop type fasteners, snaps, buttons and the like. Preferably, the fastener is a zipper 26 extending from the top front 28 of the garment 22 to the bottom front 30 of the garment 22. Optionally, the garment 22 further includes a plurality of pockets 32, preferably on the front portion 34 of the garment 22.

FIG. 5 is a front view of the medical garment of the present invention in use. Illustrated is a user 10 donning the present invention’s antimicrobial medical garment 22. The antimicrobial medical garment 22 is formed of an antimicrobial fabric 24, for example, as a medical scrub, and includes a fastener for opening and closing the garment whereby a user can remove the garment 22 without exposing one’s face 16 to the garment’s outer surface. The fastener can be, for example, a zipper, hook and loop type fasteners, snaps, buttons and the like. Preferably, the fastener is a zipper 26 extending from the top front 28 of the garment 22 to the bottom front 30 of the garment 22. Optionally, the garment 22 further includes a plurality of pockets 32, preferably on the front portion 34 of the garment 22.

FIG. 6 is a front view of the closed medical garment of the present invention in use. The present invention provides an antimicrobial medical garment 22. The antimicrobial medical garment 22 is formed of an antimicrobial fabric 24, for example, as a medical scrub, and includes a fastener for opening and closing the garment whereby a user 10 can remove the garment 22 without exposing one’s face 16 to the garment’s outer surface. The fastener can be, for example, a zipper, hook and loop type fasteners, snaps, buttons and the like. Preferably, the fastener is a zipper 26 extending from the top front 28 of the garment 22 to the bottom front 30 of the garment 22. Optionally, the garment 22 further includes a plurality of pockets 32, preferably on the front portion 34 of the garment 22.
FIG. 7 is an enlarged view of the antimicrobial fabric 24 of the present invention. Shown is the present invention comprising a fabric 36 having a plurality of silver threads 38 incorporated therein. The fabric can generally comprise any fabric suitable for the manufacture of antimicrobial medical garments including tunics, gowns, coveralls, jackets, scrub tops, scrub pants, lab coats, footwear covers, linens, curtains and dividers. The fabric may include woven and non-woven fabrics and cloths, for example natural fiber fabrics such as cotton, wool, silk, hemp and the like and synthetic materials such as polyester, polypropylene, nylon and the like, and combinations thereof. A preferred fabric is a cotton/polyester blend fabric. The incorporation of silver threads 38 provides the antimicrobial characteristic to the antimicrobial fabric 24.

FIG. 8 is an illustrative view of the present invention 22. Shown is the present invention being a medical scrub 40 formed of an antimicrobial fabric 24, constructed of silver thread 38 impregnated cloth 42 utilized in order to limit biological contamination from the scrub 40. The medical scrub 40 includes a fastener for opening and closing the scrub 40 whereby a user can remove the scrub 40 without exposing one's face to the scrub's outer surface. The fastener can be, for example, a zipper, hook and loop type fasteners, snaps, buttons and the like. Preferably, the fastener is a zipper 26 extending from the top front 28 of the scrub 40 to the bottom front 30 of the scrub. Optionally, the scrub 40 further includes a plurality of pockets 32, preferably on the front portion 34 of the scrub 40. The cloth 42 has incorporated therein a plurality of silver threads 38. The incorporation of silver threads 38 provides the antimicrobial characteristic to the antimicrobial fabric 24.

It will be understood that each of the elements described above, or two or more together may also find a useful application in other types of methods differing from the type described above.

While certain novel features of this invention have been shown and described and are pointed out in the annexed claims, it is not intended to be limited to the details above, since it will be understood that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.

1. An antimicrobial fabric comprising a material selected from woven fabrics and non-woven fabrics having a plurality of silver threads incorporated therethrough.

2. The antimicrobial fabric according to claim 1, wherein said antimicrobial fabric is formed as a woven fabric having silver threads interwoven therewith.

3. The antimicrobial fabric according to claim 2, wherein said woven fabric is selected from natural fibers, synthetic fibers, and blends of natural and synthetic fibers.

4. The antimicrobial fabric according to claim 3, wherein said woven fabric is selected from one or more of cotton, wool, silk, hemp, polyester, polypropylene and nylon.

5. The antimicrobial fabric according to claim 3, wherein said woven fabric is a blend of one or more natural fibers and one or more synthetic fibers.

6. The antimicrobial fabric according to claim 5, wherein said one or more natural fibers is selected from one or more of cotton, wool, silk and hemp, and said one or more synthetic fibers is a polymeric compound selected from one or more of polyester, polypropylene, spandex and nylon.

7. The antimicrobial fabric according to claim 6, wherein said woven fabric is a blend of cotton and polyester fibers.

8. The antimicrobial fabric according to claim 7, wherein said silver threads are unbonded to said cotton and polyester fibers.


10. The antimicrobial medical garment according to claim 9, wherein said woven fabric is a blend of one or more natural fibers and one or more synthetic fibers.

11. The antimicrobial medical garment according to claim 10, wherein said one or more natural fibers is selected from one or more of cotton, wool, silk and hemp, and said one or more synthetic fibers is a polymeric compound selected from one or more of polyester, polypropylene, spandex and nylon.

12. The antimicrobial medical garment according to claim 11, wherein said woven fabric is a blend of cotton and polyester fibers.

13. The antimicrobial medical garment according to claim 12, wherein said silver threads are unbonded to said cotton and polyester fibers.

14. The antimicrobial medical garment according to claim 13 selected from tunics, gowns, coveralls, jackets, scrub tops, scrub pants, lab coats, footwear covers, linens, curtains and dividers.

15. The antimicrobial medical garment according to claim 14, further comprising a fastener for opening said garment, said fastener selected from buttons, snaps, hook and eye fasteners, hook and loop fasteners and zippers.

16. The antimicrobial medical garment according to claim 15, wherein said fastener extends the length of the garment.

17. The antimicrobial medical garment according to claim 16, wherein said fastener is a zipper.

18. The antimicrobial medical garment according to claim 17, wherein said zipper extends approximately from a top front of the garment to a bottom front of the garment.

19. The antimicrobial medical garment according to claim 18, wherein said garment is a medical scrub.

20. The antimicrobial medical garment according to claim 19, further comprising a plurality of pockets.