(54) Title: MANUFACTURING METHODS OF FIBERS, WHICH ARE PREPARED BY ELECTROLYZING GOLD OR SILVER

(57) Abstract: The present invention relates to manufacturing methods of fibers, which are prepared by electrolyzing gold or silver particles in distilled water or refined water at direct current of 28-34 V; and blending 30 ppm of the prepared gold or silver particles in the size of 0.005µm -0.015 µm with monomers of polyacryl nylon, followed by spinning the result mixture. The fibers in this invention produce disinfecting effect and are beneficial to human body.
MANUFACTURING METHODS OF FIBERS, WHICH ARE PREPARED BY ELECTROLYZING GOLD OR SILVER

Technical Field

The present invention relates to manufacturing methods of fibers containing gold or silver particles, which have an important effect of sterilization or disinfection of non-woven textile or fibers serviceable to diapers, hygienic bands, tea-packing papers or garments.

Background Art

First, some description on gold is given such as: the hardness of gold is 2.5-3 and malleability or ductility is very excellent; the thickness of gold foil is usually 0.00001 cm; only 1 g of gold can be 3,000 m long spun gold; and further the color of solid gold changes as its states, for example its massive form is yellow, its powder or colloid is violet, in melting it become green, in the form of the deposition layer it become red, and in thin foil its green color changes to blue one.

Furthermore, gold is a very good conductor of electricity or heat. Its electric conductivity is 67% of silver, its specific resistance is $2.2 \times 10^{-6} \Omega \cdot \text{cm}$, and the heat conductivity is 0.708 cal/cm sec deg, or 70% of silver. Also, gold itself as well as its color never change in the air or water, even in an strong acid. However gold can be dissolved in the aqua regia, to become hydrogen tetra
chloroaurate(III). In the aqueous solution of cyano basic salt with existence of oxygen, gold dissolves to be cyano aurate. In high temperature, gold reacts with chlorine or bromine, but not with oxygen or sulfur. In its compounds gold has oxidation number of 1-3.

Next, silver has been known to be, in the form of colloidal silver, harmless to human bodies, and a non-poisoning and non-tolerant compound, so it has no side effects unlike common medicals or pharmaceuticals. Further, silver has strong sanitary or disinfecting effects, as well as skin-protecting or regenerating effects by alleviating some skin troubles such as pimples, swellings, skin eruptions, eczema or dermatophytosis.

**Antibiotic fibers containing various kinds of antibiotic or deodorizing compounds have been disclosed. However, in said previous art, because the bond between antibiotic compounds and fibers is imperfect, detachment and degeneration of the antibiotic compounds by laundering, heating or UV radiating is frequent, further deleterious substances to human and natural environment is often generated. For examples, products containing triclo acid generates toxic materials such as dioxin by high-temperature heating or long irradiation of UV; inorganic antibiotics such as antibiotic zeolites or silicon dioxide can become discolored and produce toxic metals; organic antibiotics such as guanidines, phenols, and ammoniums of IV group such as octadecyl(dimethyl(3-trimethoxypropyl)ammonium
chloride, benzoalconium chloride or cetyltrimethylbenzylammonium chloride can make harmless cells act as disease-causing germs or give a chance of infiltration of diseased germs due to collapse of the balance between said organic antibiotics and the surface of microorganisms, and can cause skin diseases in an sensitive part of human's skin.

Disclosure of the Invention

To overcome said problems in prior art, fibers containing silver particles harmless to human beings were experimentally manufactured, but fine fiber structure of fibers containing silver particles was very difficult to construct.

The inventors of this invention, considering aforementioned problems, achieved by manufacturing antibiotic fibers according to following method: adding, in manufacturing synthetic polymers, harmless gold or silver particles in the ionic form to the polymer and then operate the spinning process; or applying and attaching gold or silver particles to completely made polymers. The fibers manufactured according to said method is serviceable to diapers, hygienic bands, tea-packing papers or garments. Thus, one purpose of the invention is providing antibiotic fibers containing 5ppm of silver particles in the size of 0.0005-0.015 \( \mu \text{m} \).
Another purpose of the invention is providing the fibers which are prepared by electrolyzing gold or silver particles in distilled water or refined water at direct current of 28-34 V.

5 Best Mode for Carrying Out the Invention

Below, detailed descriptions are offered to illustrate the fibers containing gold or silver particles according to this invention and are not meant to be construed in any way as limiting the scope of this invention. An expert in the art can sufficiently understand that substitution or change of the blending or manufacturing method and ingredients be admitted in the range of the invention’s concept and further be included by the range of the invention. The silver-containing fiber of the invention is achieved by blending silver particles into a synthetic polymer. This can be performed by adding silver solution containing silver ions to the polymer and then operate the spinning process; or spraying gold or silver particles to completely-made polymers. In the case of the latter method, silver particles are detected in the surface of the fiber, whereas the former method makes silver particles infiltrate into the inner of the fiber.

15 The fibers prepared according to above mentioned methods are used in diapers, hygienic bands or tea-packing papers, and when the fiber is used in apparel, the clothes are safe to a sensitive skin like
allergy because of the affinity to skin of silver ion, and have disinfecting and sterilizing effects due to those effects of silver.

Example 1

Below, the manufacturing methods of fibers containing gold or silver particles are closely explained by Example 1.

The raw materials of tea-packing paper are Manila hemp fiber and thermal stable fiber, which have affinity to silver ion. Thus after said liquid Manila hemp fiber and thermal stable fiber were blended, silver solution in 7ppm of the silver whose size is 0.0005 \( \mu \text{m} \) was added to the mixed polymer and then the final mixture was stirred, spun, and dried to remove water.

Since the raw material of fibers for apparel, or a kind of synthetic polymer has little affinity to gold or silver ion, the polymer fibers were prepared according to conventional method. Then gold or silver solution containing 10ppm of gold or silver particles in the size of 0.0005 \( \mu \text{m} \) was sprayed on the prepared fiber, followed by drying; or the prepared fiber was immersed into said gold or silver solution, followed by drying.

Example 2

Further, the manufacturing methods of fibers containing gold or silver particles are closely explained by Example 2.
Gold or silver particles were electrolyzed in distilled water or refined water at direct current of 28-34 V, resulting in 30ppm of the prepared gold or silver particles in the size of 0.005-0.015 μm. Then 3% of said solution of gold or silver particles was blended with monomers of polyacryl nylon, followed by spinning and coating the result mixture.

Industrial Applicability

As shown above, the fiber containing gold or silver particles have a sterilizing or disinfecting effect and beneficial effects on human being, especially helping the metabolism. Therefore the inventive fiber is serviceable to diapers, hygienic bands, tea-packing papers or garments, and very useful for the corresponding industry.

Although the preferred embodiments of the invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.
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Claims

1. Manufacturing methods of fibers containing gold or silver particles, wherein said fibers are prepared by electrolyzing gold or silver particles in distilled water or refined water at direct current of 28-34 V; and blending 30ppm of the prepared gold or silver particles in the size of 0.005-0.015μm with monomers of poly acrly nylon.

2. The manufacturing methods of fibers containing gold or silver particles, wherein fibers prepared according to claim 1 are woven to textiles.

3. Manufacturing methods of fibers containing gold or silver particles, characterized by said fiber on which the gold or silver solution is sprayed, wherein said solution is prepared by electrolyzing gold or silver particles in distilled water or refined water at direct current of 28-34 V, resulting in 30ppm of the prepared gold or silver particles in the size of 0.005-0.015μm.

4. Manufacturing methods of textiles containing gold or silver particles, characterized by said textiles on which the gold or silver solution is sprayed, wherein said solution is prepared by electrolyzing gold or silver particles in distilled water or refined water at direct current of 28-34 V, resulting in 30ppm of the prepared gold or silver particles in the size of 0.005-0.015μm.
### INTERNATIONAL SEARCH REPORT

**A. CLASSIFICATION OF SUBJECT MATTER**

**IPC7 D01F 1/10**

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)

**IPC7 D01F**

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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Further documents are listed in the continuation of Box C.

See patent family annex.

### Date of the actual completion of the international search

22 NOVEMBER 2001 (22.11.2001)

### Date of mailing of the international search report

23 NOVEMBER 2001 (23.11.2001)

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