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Cleaning product.

(57)

The invention relates to a cleaning product for cleaning contaminated surfaces comprising a textile structure of fibres, wherein fibres are provided with an agent with biocide action, wherein for instance a part of the fibres is provided with the biocidal agent, the biocidal agent is incorporated in the fibres or the surface of the fibres is coated with the biocidal agent.

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The present invention relates to a cleaning product such as a cleaning cloth, for instance a floor cleaner and a cleaning glove, based on a textile structure and more particularly to a cleaning product with a textile structure in which substantially no cleaning products such as soaps, emulsifiers, solvents (anti-)foaming agents and the like are included in order to provide or enhance the product cleaning properties. The textile structure provides the product with its cleaning properties.

The textile structure, such as a knitted material, woven material, non-woven or brush, comprises fibres which are cut on at least one side of the structure, whereby microfibrils are formed protruding from this side which provide the textile structure with the cleaning properties.

Such cleaning products can be used in the household, in the sauna, the office and the workplace to clean skin, objects, tools and floors. Depending on the intensity of use the cleaning product retains its cleaning action for a long period and can be washed regularly, for example five to ten times. It has nevertheless been established that the appreciation of the cleaning product and its cleaning action decrease due to colour change, odour formation and accumulation of alien material.

The present invention has for its object to change the cleaning product such that the appreciation increases and the above described undesired effects are avoided as far as possible, while there is substantially no adverse effect on the cleaning properties, let alone that it is required that additional means must be added to the finished cleaning product by the user.

It has been found that the above described phenomena can be traced back to an undesired bacteria/mould growth in the textile structure, wherein the present invention is based on steps which prevent or avoid such a bacteria/mould growth.

This is achieved according to the invention with a cleaning product according to the invention for cleaning contaminated surfaces comprising a textile structure of fibres, wherein fibres are provided with an agent with biocidal action. Providing the fibres with the biocidal agent achieves that bacteria/mould accumulating in the vicinity of the fibres are inhibited in their growth and possibly even killed.

Understood by a biocidal agent is an agent which inhibits the growth of and/or kills bacteria/mould. Not every biocidal agent can be used since according to the invention it is required that the biocidal agent is incorporated into or fixed on the textile structure.

Use can for instance be made of a biocidal metal or metal compound such as water-insoluble metal salts. Suitable metals comprise copper, cop-

per powder and copper salts.

The quantity of biocidal agent for adding to the textile structure depends on the application of the cleaning product, the type of fibre of the textile structure and the nature of the biocidal agent per se. A quantity of biocidal agent in the textile structure is usually sufficient of about 0.001-10% by weight, preferably 0.020-7% by weight, in general 0.050-5% by weight. For many applications it may only be necessary for the biocidal agent to be present in a part of the fibres which then provide the biocidal action to the whole of the textile structure into which they are woven or knitted.

According to a first embodiment the biocidal agent can be incorporated in the fibres, wherein they are incorporated in the matrix of the fibres. In this case the biocidal agent can be released on the surface through wear of the fibres and be transferred to the cleaned surface. According to another embodiment the biocidal agent can be arranged on the surface of the fibres in substantially irreversible manner physically or chemically, whereby these fibres are provided with a coating with the biocidal agent.

In the case the biocidal agent is incorporated in the fibre matrix it is recommended that the biocidal agent is added during the formation (extrusion/spinning) of the fibres (synthetic fibres) or during the preparation of the fibres (natural fibres). In the case the surface is coated the biocidal agent can be applied by means of a physical process or coated thereon via an immersion in a solution containing the biocidal agent.

It is self-evident that the fibres which are provided with the biocidal agent do not have to have the same chemical composition as the fibres used to form the textile structure. Fibres which are suitable for incorporating the biocidal agent are for example polyester fibres, nylon fibres, acryl fibres and cotton fibres, wool fibres and cellulose fibres insofar as they can be bonded to the biocidal agent physically or chemically in substantially irreversible manner. It is possible to use specifically cleaning fibres and specifically biocidal fibres.

An optimum cleaning product is obtained when the textile structure comprises microfibrils protruding from the textile structure and contains substantially no cleaning agent. For many textile structures which are used in cleaning under moist or wet conditions the drawback occurs that water drips from the cleaning product and can come into contact with the user. Under these conditions it is recommended that the textile structure comprises water-retaining fibres whereby this dripping of liquid out of the cleaning product is substantially avoided.

The cleaning product can have a textile structure based on a woven or knitted material. A woven

material has a very rigid structure in the direction of the warp and weft threads and is therefore suitable for products whose dimensional stability is a requirement, such as floor cleaners and cleaning gloves. In the case the cleaning product has one or more curved forms it is recommended that the textile structure consists of a knitted material, the looped threads of which are suitable for absorbing the stresses at the position of the curve. For many applications there is the option that the cleaning product consists of a textile structure on the basis of a woven and/or knitted material. Very suitable cleaning products according to the invention take the form of a floor cleaner which can be arranged on a floor plate operated by a handle or a cleaning glove into which the user places his hand and carries out the cleaning operations on the object with the hand. Very many biocidal agents can be used for the cleaning product according to the invention insofar as they do not damage the health of the user and his surroundings. A suitable group of biocidal agents is formed by quaternary ammonium compounds which are currently applied in disinfectants. These agents can be applied by immersion to the fibres for inclusion in the fibre structure or the textile structure can be immersed integrally therein. These compounds adhere to the fibre surface and leach at a very low speed. The leaching speed can be further slowed by increasing the cohesion to the fibres or by providing the biocidal agent with a functional group which can be covalently bonded to fibre material.

Another group of biocidal agents is formed by metal ions and metal particles with biocide activity (for instance copper), which metals are bonded substantially irreversibly to the fibres in an inorganic or organic compound/complex; the metal particles are for instance incorporated in the fibre matrix and are released gradually during fibre wear.

Understood by fibres are threads, yarns and the like which can consist of monofilaments and multifilaments, wherein the biocidal agent can be arranged on the fibre itself or on its filament, or can be enclosed in the fibre matrix or between the fibre filaments.

Mentioned and other features of the cleaning products according to the invention will be further elucidated hereinafter with reference to a number of non-limitative embodiments relating to the manufacture of cleaning products according to the invention. These examples are only given by way of elucidation without the invention being limited thereto.

Example 1

A textile structure in the form of a weave is woven from polyester fibres and the woven ma-

terial is cut on one side, thereby resulting in micro-fibres protruding on this side. This textile structure in the form of a strip is guided through an immersion liquid containing a quaternary ammonium compound such as alkyldimethylbenzyl ammoniumchloride. The alkyl group preferably has a very long carbon chain whereby the cohesion to the polyester fibre surface is high. Dodigen 226 (trademark Hoechst) can for instance be used in a solution of 3-5% by weight.

The manufactured cleaning product displays a good biocidal action which decreases gradually with prolonged use and interim washing. However, the duration of use due to the non-occurrence of colour change and odour formation as well as accumulation of alien material is considerably lengthened.

Example 2

Acryl fibres or nylon fibres are impregnated by corona discharge with copper sulphide which is chemically adhered to the fibre surface. These acryl and nylon fibres are subsequently co-knitted in the manufacture of a textile structure based on polyester fibres, whereafter the textile structure is further processed as according to example 1 so as to obtain microfibres on this side. The acryl or nylon fibres form only 0.005 to 0.5% by weight of the textile structure while an excellent, substantially permanent biocidal action is obtained.

Example 3

During weaving of a textile structure from polyester fibres, fibres are also interwoven whereof the fibre matrix is provided with a biocidal agent, for instance a sodium aluminosilicate incorporated in the matrix to which copper is added (Diolen, trademark Akzo). These biocidal fibres are interwoven in a quantity by weight of for instance 0.01-10 % by weight, such as 0.2-8% by weight, in particular 0.3-5% by weight of the textile structure. Viscose fibres are further interwoven which provide the textile structure with an increased water-retaining capacity.

Example 4

A polyethylene master-batch is co-extruded with copper powder (0.1-100 μm) such that the obtained extrudate contains copper (grains) in a quantity by weight of for example 5-30% by weight.

A co-extrusion of the copper extrudate subsequently takes place with polyethylene whereby fibres are spun which contain copper as biocide in a concentration by weight of 0.1-3% by weight.

Depending on the intended purpose a cleaning product can be woven which contains fibres containing only copper particles or a mixture of copper particle-containing fibres and other polyester fibres. It is moreover possible to apply instead of polyester fibres other fibres, for example water-absorbing natural fibres.

In the case the fibres contain a high concentration of copper particles it is possible to use typical cleaning fibres as additional fibres, whereby the cleaning action is substantially unaffected by the addition.

An advantage of this embodiment is that the metal particles are originally present in the matrix and are released by wear of the fibre during the cleaning of surfaces and are partly transferred to the cleaned surface, thereby resulting in a preventive cleaning.

Thus is created a cleaning product with an outstanding biocidal action, while the cleaning properties are substantially not essentially changed, and this cleaning product can in fact be used until the textile structure has degenerated due to wear.

The cleaning product according to example 1 can preferably be applied in a floor cleaner, while the cleaning products of examples 2 and 3 can also be applied in the cleaning gloves. The cleaning product according to example 4 is suitable for both applications.

Claims

1. Cleaning product for cleaning contaminated surfaces comprising a textile structure of fibres, wherein fibres are provided with an agent with biocide action. 35
2. Cleaning product as claimed in claim 1, wherein a part of the fibres is provided with the biocidal agent. 40
3. Cleaning product as claimed in claim 1 or 2, wherein the biocidal agent is incorporated in the fibres. 45
4. Cleaning product as claimed in claims 1-3, wherein the surface of the fibres is coated with the biocidal agent. 50
5. Cleaning product as claimed in claims 1-4, wherein the fibres or the textile structure are saturated in a solution containing the biocidal agent. 55
6. Cleaning product as claimed in claims 1-5, wherein the textile structure comprises micro-fibres protruding from the textile structure and

contains substantially no cleaning agent.

7. Cleaning product as claimed in claims 1-6, wherein the textile structure comprises water-retaining fibres. 5
8. Cleaning product as claimed in claims 1-7, wherein the textile structure is a woven or knitted material. 10
9. Cleaning product as claimed in claims 1-8 in the form of a cleaning cloth. 15
10. Cleaning product as claimed in claims 1-9 in the form of a floor cleaner or a cleaning glove. 20
11. Cleaning product as claimed in claims 1-10, wherein fibres provided with the biocidal agent comprise fibres whereof the fibre matrix is provided with metal particles, such as copper particles, incorporated therein. 25



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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 2549

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US-A-4 525 411 (K. SCHMIDT) * the whole document * ---	1-4,6-10	A47L13/17
X	EP-A-0 099 209 (SURGIKOS INC) * page 5 - page 6 * ---	1-5,8	
X	CH-A-622 427 (E. KELLER) * the whole document * ---	1-4	
X	GB-A-2 061 709 (J.E. BEECHAM-WALTERS) * page 2, line 7 - line 14 * ---	1,9,10	
X	GB-A-2 158 701 (M. TOSH) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A47L
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 6 December 1994	Examiner VANMOL, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			