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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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(54) Title: SILICONE SPONGE WITH NON-TRANSFORMATION

(57) Abstract: Disclosed is a silicone sponge with non-transformation comprising 100 parts by weight of silicone, 5 parts by weight of a foaming agent, 5 parts by weight of an anti-discoloring agent, and 1 part by weight of a pigment.The silicone sponge with non-transformation in which the anti-discoloring agent is neutralized with perfluorohexane (PFH) has no discoloration after an elapse of a predetermined time and is suitable for a long-term use, thereby increasing the quality of a silicone sponge product.The silicone sponge may further comprise 10 parts by weight of at least one selected from the group consisting of pine leaf, mugwort, chitosan and charcoal, thereby capable of expressing a natural scent or sense.

SILICONE SPONGE WITH NON-TRANSFORMATION

Technical Field

The present invention relates to a silicone sponge with non-transformation and, more particularly, to a silicone sponge with non-transformation that shows no discoloration after an elapse of a predetermined time.

Background Art

In general, silicone-based sponges are in great demand because they are quite flexible and excellent in heat resistance and cold resistance, compared to normal sponges. Such silicone sponges are, however, susceptible to discoloration from light, heat, chemicals, etc. in use and, if any, discoloration is readily recognized to cause an unpleasant feeling in the esthetic aspect. Some documents disclose silicone sponges with improved mechanical strength and foaming ability. But, there has never been reported on the case of preventing discoloration of the silicone sponges.

In the field of apparel and electronic element, non-transformation refers to a discoloration-proofing ability. Conventionally, an anti-discoloring agent has been used as an additive to provide non-transformation. Such a conventional anti-discoloring agent is not so effective and causes discoloration after an elapse of a predetermined time, thereby deteriorating the quality of the product using the anti-discoloring agent.

Disclosure of Invention

It is an object of the present invention to solve the problem with the prior art and to provide a silicone sponge with non-transformation that has no discoloration after an elapse of a predetermined time and is suitable for a long-term use.

It is another object of the present invention to provide a silicone sponge with non-transformation improved to give off a natural sense.

In one aspect of the present invention, there is provided a silicone sponge with non-transformation that includes 100 parts by weight of silicone, 5 parts by weight of a foaming agent, 5 parts by weight of an anti-discoloring agent, and 1 part by weight of a pigment.

The anti-discoloring agent is neutralized with perfluorohexane. The addition of the neutralized anti-discoloring agent provides a non-transformation characteristic to the silicone sponge.

Perfluorohexane is an organic solvent and surface active agent that reduces the surface tension and neutralizes the alkaline anti-discoloring agent. The neutralized anti-discoloring agent prevents the silicone sponge discolored from light, heat, chemicals, etc.

In another aspect of the present invention, there is provided a silicone sponge further comprising 10 parts by weight of at least one selected from the group consisting of pine leaf, mugwort, chitosan and charcoal. A natural material such as the pine leaf, mugwort, chitosan and charcoal provides a natural scent or sense to the synthetic silicone sponge.

Best Mode for Carrying Out the Invention

Hereinafter, the present invention will be described in detail to the preferred embodiments of the present invention, examples of which are illustrated.

Silicone as used herein was polyorganosiloxane having an average degree of polymerization ranging from 3,000 to 30,000. A foaming agent as used herein was a known foaming agent, azobisisobutyronitrile (AIBN). An anti-discoloring agent as used herein was KEP-22™ (supplied by Shinetsu Chemical Co., Japan), which was diluted with perfluorohexane (PHF) for neutralization.

In a milling mixer were uniformly mixed 100 parts by weight of the silicone, 5 parts by weight of the foaming agent, 5 parts by weight of the anti-discoloring agent, and 1 part by weight of a pigment. The mixture was then formed into a silicone sponge with non-transformation according to the present invention. The silicone sponge thus obtained was colorless, odorless and nontoxic. As a comparative example, a silicone sponge was prepared in the same manner as described above, excepting that the anti-discoloring agent was not neutralized.

To compare the two products in terms of discoloration, the silicone sponges were kept in a cold dark place or in atmosphere for 240 hours, macroscopically examined for their apparent color and measured in regard to APHA (American Public of Health Association) color. The results are presented in Table 1.

[Table 1]

Div.	Example		Comparative Example	
	0 hr.	After 240 hrs.	0 hr.	After 240 hrs.
Appearance	Colorless	Colorless	Colorless	Yellow
APHA Color	10	10	10	35

As can be seen from Table 1, the silicone sponge comprising a neutralized anti-discoloring agent according to the present invention seldom showed discoloration even after 240 hours, while the silicone sponge comprising a non-neutralized anti-discoloring agent turned yellow in 240 hours.

In another example, 10 parts by weight of one or mixture of pine leaf, mugwort, chitosan and charcoal were further added to the silicone sponge of the above composition. As a result, the silicone sponge expressed a natural scent or sense, and provided a user with comfort, stability or safety.

Industrial Applicability

The silicone sponge of the present invention may be used not only as a normal silicone sponge but also for multiple purposes.

For example, the silicone sponge is applicable to almost all possible products, including apparels (e.g., garment, underwear, quilted clothes, etc.), bags, shoes, or beddings.

Especially, when the silicone sponge with transformation is used as a liner in combination with a white cloth, such as in a garment or underwear, for example, as the liner of a brassiere or the inner material of a quilted cloth, it can be discolored after an elapse of a predetermined time and adversely affect the outer cloth to deteriorate the quality of the product. This also causes deterioration of the reliability for all other products using the sponge material.

According to another example of the present invention, a silicone sponge may comprise, in addition to the above-mentioned principal ingredients, 10 parts by weight of at least one selected from the group consisting of pine leaf, mugwort, chitosan and charcoal.

The addition of the natural material makes the silicone sponge give off a natural scent or sense instead of a bad chemical odor or sense and, if applied to underwear or garments, gives a pleasant feeling to other people.

Of course, this invention covers various modifications within the spirit and scope of the appended claims, including the other characteristics of the present invention sponge, for example, giving few wrinkles to the clothes.

As described above, the silicone sponge with non-transformation comprising a neutralized anti-discoloring agent has no discoloration after an elapse of a predetermined time and is suitable for a long-term use, thereby increasing the quality of silicone sponge product.

What is claimed is:

1. A silicone sponge with non-transformation comprising 100 parts by weight of silicone, 5 parts by weight of a foaming agent, 5 parts by weight of an anti-discoloring agent, and 1 part by weight of a pigment, the anti-discoloring agent being neutralized with perfluorohexane.

2. The silicone sponge with non-transformation as claimed in claim 1, further comprising 10 parts by weight of at least one selected from the group consisting of pine leaf, mugwort, chitosan and charcoal.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC7 C08J 9/06

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)

IPC7 C08J

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

KR, JP as above

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 590 222 A (THERESE M. BAUMAN) 20 May 1986 see the whole document	1 - 2
A	US 4 559 369 A (THERESE M. BAUMAN) 17 December 1985 see the whole document	1 - 2
A	EP 456 557 A (SHIN-ETSU CHEMICAL CO., LTD) 13 November 1991 see page 2, line 43 - page 3, line 5	1 - 2
A	JP 07-18810 A (TOSHIBA SILICONE CO., LTD) 20 January 1995 see the whole document	1 - 2
A	JP 2001-131415 A (DOW CORNING TORAY SILICONE CO., LTD) 15 May 2001 see the whole document	1 - 2

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevence

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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 relevence; 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 relevence; 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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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