A mattress, mattress topper, mattress protector, bedspread, or pillow covering material, in particular for covering mattresses, mattress protectors, mattress cases, mattress toppers, pillow cases, shirt cases, or underbedding, has at least one material layer made of a knitted, warp-knitted, or woven material having an outer side, which faces away from the mattress, mattress topper, mattress protector, bedspread, or pillow core in the covered state, and an inner side, which faces toward the mattress, mattress topper, mattress protector, bedspread, or pillow core in the covered state, wherein at least a partial region of the outer side or the inner side has color-changeable indicator particles to indicate a contamination by mite excrement, bodily fluids, or bacteria. Furthermore, a mattress, mattress topper, mattress protector, bedspread, or pillow covering are described.
MATTRESS, MATTRESS TOPPER, MATTRESS PROTECTOR, BEDSPREAD, OR PILLOW COVERING MATERIAL AND COVERING AND MATTRESS, MATTRESS TOPPER, MATTRESS PROTECTOR, PILLOW OR BEDSPREAD CORE

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application claims the priority of German Patent Application, Serial No. 20 130 100.475.8, filed Feb. 1, 2013, pursuant to 35 U.S.C. 119(a)-(d), the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to a covering material for and core of, a mattress, mattress topper, mattress protector, bedspread or pillow.

[0003] The following discussion of related art is provided to assist the reader in understanding the advantages of the invention, and is not to be construed as an admission that this related art is prior art to this invention.

[0004] Mattress, mattress topper, mattress protector, bedspread, or pillow covering materials, mattress, mattress topper, mattress protector, bedspread, or pillow coverings, and also mattress, mattress topper, mattress protector, pillow, or bedspread cores according to the species are known in numerous embodiment variants from the prior art. In particular to restrict the load of these covering materials or objects, which are predominantly used in the field of sleep, with bacteria or allergens, which are contained in particular in the excrement of house dust mites, it is known to provide the above-mentioned materials and objects, for example, during the finishing, with antibacterial and/or anti-allergen agents, for example, in the form of an antimicrobial finishing such as silver threads or the like.

[0005] To avoid such contaminants by mites, mite excrement, dandruff, bacteria, or bodily fluids it is necessary to regularly clean the mattress, mattress topper, mattress protector, bedspread, or pillow covering materials, for example, by washing the covering materials or one or more layers of a mattress, mattress topper, mattress protector, bedspread, or pillow, respectively.

[0006] It would therefore be desirable and advantageous to provide a covering for and core of a mattress, mattress topper, mattress protector, bedspread or pillow, which allows recognizing the point at which the degree of contamination has reached a predetermined amount, so that the relevant object should be washed, in order to keep the load of the mattress, the mattress topper, the mattress protector, the bedspread, or the pillow with contaminants as low as possible and thus avoid possible allergic reactions of a user, on the one hand, and to be able to avoid excessively frequent washing, on the other hand.

SUMMARY OF THE INVENTION

[0007] According to one aspect of the present invention, a covering material for mattresses, mattress protectors, mattress cases, mattress toppers, pillow cases, shirt cases, or underbedding, includes at least one material layer made of a knitted, warp-knitted, or woven material having an outer side, which faces away from the mattress, mattress topper, mattress protector, bedspread, or pillow core in the covered state, and an inner side, which faces toward the mattress, mattress topper, bedspread, or pillow core in the covered state; and color-changeable indicator particles provided in at least a partial region of the outer side or the inner side for indicating a contamination by mite excrement, bodily fluids, or bacteria.

[0008] According to the invention, at least a partial region of an outer side, which faces away in the covered state from the mattress, mattress topper, mattress protector, bedspread, or pillow core, or an inner side, which faces toward the mattress, mattress topper, mattress protector, bedspread, or pillow core, has reversibly color-changeable indicator particles for indicating a contamination by mite excrement, human bodily fluids, or bacteria.

[0009] In a corresponding manner, in the case of the mattress, mattress topper, mattress protector, pillow, or bedspread core, a partial region of the layer of the mattress, mattress topper, mattress protector, pillow, or bedspread core has reversibly color-changeable indicator particles to indicate a contamination by mite excrement, bodily fluids, or bacteria.

[0010] Also in a corresponding manner, in the case of the mattress, mattress topper, mattress protector, bedspread, or pillow covering, at least a partial region of the mattress, mattress topper, mattress protector, bedspread, or pillow covering has reversibly color-changeable indicator particles to indicate a contamination by mite excrement, bodily fluids, or bacteria.

[0011] By way of the integration of these indicator particles, which react to contamination by mites, bacteria, or bodily fluids with a color change, it is shown to the user in a striking manner by this color changeover that the mattress, mattress protector, bedspread, or pillow covering material or the corresponding mattress, mattress topper, mattress protector, pillow, or bedspread core is to be cleaned. Due to the washing procedure and the cleaning accompanying it of the contaminants which trigger the color changeover, the color of the indicator particles changes back into the original color and therefore displays the cleaned state of the corresponding object to the user.

[0012] In the case of non-washable mattresses, mattresses toppers, mattress protectors, bedspreads, or pillows or of one layer of a mattress consisting of multiple layers, a mattress topper, a mattress protector, a bedspread, or a pillow, it is easily recognizable to the user due to the coloration by the indicator particles that further use of the contaminated object is not recommended and the object should be disposed of in particular to avoid allergic reactions as a result of the contamination.

[0013] According to another advantageous feature of the present invention, the color-changeable indicator particles are incorporated in a yarn, from which the mattress or bedspread or pillow covering material is produced. This incorporation can be performed both during the dyeing of the yarn used or also in the finishing process of the covering material.

[0014] Of course, it is also conceivable to provide not only a partial region of the outer side or the inner side with the indicator particles, but rather to incorporate the indicator particles over the entire surface.

[0015] According to another advantageous feature of the present invention, the color-changeable indicator particles can be printed onto at least the partial region of the outer side or the inner side.

[0016] According to another advantageous feature of the present invention, the color-changeable indicator particles can be incorporated in a yarn of an embroidery applied at least to the partial region of the outer side or the inner side.
It is also conceivable to apply the color-changeable indicator particles as a sprayed layer onto at least the partial region of the outer side or the inner side.

According to another advantageous feature of the present invention, the color-changeable indicator particles can be constructed as indicator particles which are sensitive to pH value, amine, and/or guanine.

BRIEF DESCRIPTION OF THE DRAWING

Other features and advantages of the present invention will be more readily apparent upon reading the following description of currently preferred exemplified embodiments of the invention with reference to the accompanying drawing, in which:

FIG. 1 shows a perspective view of a mattress with color-changeable indicator particles according to the present invention; and

FIG. 2 shows a perspective view of a pillow with color-changeable indicator particles according to the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Throughout all the Figures, same or corresponding elements may generally be indicated by same reference numerals. These depicted embodiments are to be understood as illustrative of the invention and not as limiting in any way. It should also be understood that the Figures are not necessarily to scale and that the embodiments are sometimes illustrated by graphic symbols, phantom lines, diagrammatic representations and fragmentary views. In certain instances, details which are not necessary for an understanding of the present invention or which render other details difficult to perceive may have been omitted.

Turning now to the drawing, and in particular to FIG. 1, there is shown a mattress 6 including a mattress core 1, a mattress cover 2 and a mattress protector 3. FIG. 1 also shows color changeable indicator particles 4 provided on the mattress core 1, mattress cover 2 and mattress protector 3. The color changeable indicator particles 4 can be provided on at least one of the mattress core 1, mattress cover 2 and mattress protector 3.

FIG. 2 shows a pillow 5 with the color-changeable indicator particles 4 provided on the pillow.

In an embodiment, the mattress, mattress topper, mattress protector, bedspread, or pillow covering material of a mattress, mattress topper, mattress protector, bedspread, or pillow covering according to the invention, which is used in particular for covering mattresses, mattress protectors, mattress covers, mattress toppers, pillows, shirt covers, or also underbedding, includes at least one material layer made of a knitted, warp-knitted, or woven fabric having an outer side, which faces away from the mattress, bedspread, or pillow core in the covered state, and an inner side, which faces toward the mattress, bedspread, or pillow core in the covered state. A partial region of the outer side, preferably a region on which a person lies when sleeping, is preferably provided with reversibly color-changeable indicator particles to display a contamination by mite excrement, bodily fluids, or bacteria.

In particular in the case of unquilted covering materials it is also conceivable to provide at least a partial region of the inner side, which faces toward the mattress, mattress protector, bedspread, or pillow core in the covered state, with reversibly color-changeable indicator particles to indicate a contamination by mite excrement, bodily fluids, or bacteria.

It is also conceivable to provide a textile or yarn applied to the mattress, mattress topper, mattress protector, bedspread, or pillow covering material, in the case of the textile in particular in the form of a label, a binding tape, or the like with color-changeable indicator particles to indicate a contamination by mite excrement, bodily fluids, or bacteria. The use of yarns which can be provided with the above-mentioned indicator particles includes, for example, ornamental or quilting seams applied to the covering.

In particular indicator particles come into consideration which are sensitive to pH value changes, which result, for example, due to the collection of bodily fluids in the covering material in the course of time.

A part of the indicator particles particularly preferably reacts with a color change in the event of the increase of the content of amines or guanines. Therefore, via the sensitivity of the indicator particles for guanine as a component in the excrement of house dust mites, a contamination by the substance, which generates the house dust allergy, is easily recognizable for the user.

The color-changeable indicator particles are preferably designed as microparticles, which may be added in a simple manner during the dyeing procedure of the yarns used for the production of the mattress, mattress topper, mattress protector, bedspread, or cushion covering materials.

Such indicator particles may also be added easily to a spray substrate, with which partial regions of the covering materials or also one or more layers of a mattress, mattress topper, mattress protector, pillow, or bedspread core are easily sprayable.

It is also conceivable to apply or introduce the color-changeable indicator particles during the finishing process of the respective covering material on or in the respective material layer of the covering material or the mattress, mattress topper, mattress protector, pillow, or bedspread core.

The color change preferably occurs in such a manner that in the uncontaminated or only slightly contaminated state, the color-changeable indicator particles do not influence the starting color of the respective covering material or mattress core, that is, they are colorless, and they only become visible after a predetermined degree of contamination, at which they induce a color changeover of the regions provided with the indicator particles.

Different colors are possible as the visible signal colors depending on the indicator particles used. A graduated discoloration as a function of the degree of contamination is also conceivable, so that the discoloration occurs more strongly with increasing contamination.

To eliminate the color change of the respective covering material or mattress, mattress topper, mattress protector, pillow, or bedspread core, the respective covering material is cleaned, so that the concentration of contaminants decreases to an amount at which the color of the color-changeable indicator particles changes back into its starting color, which indicates no or little contamination.

The use of these color-changeable indicator particles is possible in the case of yarns made of natural fibers, animal fibers, or also chemical fibers and therefore allows the integration of the above-described indicator microparticles, which indicate the contamination, in a plurality of starting materials for producing the mattress, mattress protector, bed-
spread, or pillow covering materials and also mattress, mattress protector, and/or pillow or bedsprad cores.

[0037] While the invention has been described in connection with currently preferred embodiments shown and described in detail, it is not intended to be limited to the details shown since various modifications and structural changes may be made without departing in any way from the spirit of the present invention. The embodiments were chosen and described in order to best explain the principles of the invention and practical application to thereby enable a person skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated.

[0038] What is claimed is:

1. A covering material for covering mattresses, mattress protectors, mattress cases, mattress toppers, pillow cases, shirt cases, or underbedding, comprising:
   - at least one material layer made of a knitted, warp-knitted, or woven material having an outer side, which faces away from the mattress, mattress topper, mattress protector, bedsprad, or pillow core in the covered state, and an inner side, which faces toward the mattress, mattress topper, bedsprad, or pillow core in the covered state; and
   - color-changeable indicator particles provided in at least a partial region of said outer side or said inner side for indicating a contamination by mite excrement, bodily fluids, or bacteria.

2. The covering material of to claim 1, wherein the color-changeable indicator particles are incorporated in a yarn from which the mattress, mattress topper, mattress protector, bedsprad, or pillow covering material is produced.

3. The covering material of to claim 1, wherein the color-changeable indicator particles are printed onto at least the partial region of the outer side or the inner side.

4. The covering material of to claim 1, wherein the color-changeable indicator particles are incorporated into a yarn of an embroidery applied at least to the partial region of the outer side or the inner side.

5. The covering material of to claim 1, wherein the color-changeable indicator particles are contained as a sprayed layer on at least the partial region of the outer side or the inner side.

6. The covering material of claim 1, wherein the color-changeable indicator particles are constructed to be sensitive to at least one of a pH value, amine, or guanine.

7. The covering material of claim 1, wherein the color-changeable indicator particles are designed as reversibly color-changeable.

8. A mattress, mattress topper, mattress protector, pillow, or bedsprad core, comprising at least one layer, wherein at least a partial region of the at least one layer has reversibly color-changeable indicator particles to indicate a contamination by mite excrement, human bodily fluids, or bacteria.

9. The mattress, mattress topper, mattress protector, pillow, or bedsprad core of claim 8, wherein the at least one layer is constructed as foam layer.

10. The mattress, mattress topper, mattress protector, pillow, or bedsprad core of claim 8, wherein the at least one layer is designed as a washable layer.

11. A covering for mattresses, mattress protectors, mattress cases, mattress toppers, pillow cases, shirt cases, or underbedding, wherein at least a part, of the covering comprises color-changeable indicator particles to indicate a contamination by mite excrement, bodily fluids, or bacteria.

12. The covering of claim 11, wherein at least a part of the covering and/or a textile or yarn applied to the covering comprises the color-changeable indicator particles.

13. The covering of claim 12, wherein the textile is implemented as a label or binding tape and/or the yarn is implemented as a useful or ornamental seam, in particular a quilting seam.

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