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(54) Titre : **PIECE COMPOSITE ET SON PROCEDE DE PRODUCTION**
 (54) Title: **A COMPOSITE PART AND PRODUCTION METHOD THEREOF**

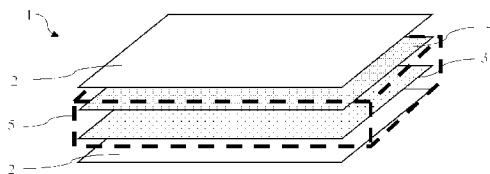


Figure 1 (a)

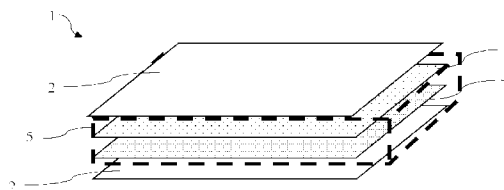


Figure 1 (b)

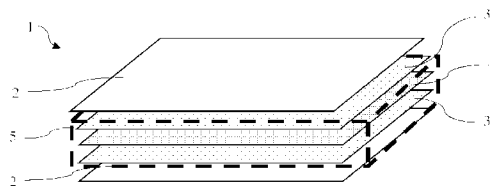


Figure 1 (c)

(57) **Abrégé/Abstract:**

The present invention relates to a patterned composite part (1) and production method thereof. Within the scope of the invention, in order to produce composite part (1) by using at least one mold, a method is provided which comprises the process steps of forming at least one gelcoat layer (2) in the said mold, laying more than one fiber layer (3) on the said gelcoat layer (2), placing patterned layer (4) on and/or between and/or under the said fiber layers (3), applying resin (5) on the structure comprised of the fiber layer (3) and the patterned layer (4), allowing the said resin (5) to be cured, removing the structure comprised of the resin (5), the fiber layers (3) and the patterned layer (4) from the said mold after the resin (5) is cured.

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Abstract:

The present invention relates to a patterned composite part (1) and production method thereof. Within the scope of the invention, in order to produce composite part (1) by using at least one mold, a method is provided which comprises the process steps of forming at least one gelcoat layer (2) in the said mold, laying more than one fiber layer (3) on the said gelcoat layer (2), placing patterned layer (4) on and/or between and/or under the said fiber layers (3), applying resin (5) on the structure comprised of the fiber layer (3) and the patterned layer (4), allowing the said resin (5) to be cured, removing the structure comprised of the resin (5), the fiber layers (3) and the patterned layer (4) from the said mold after the resin (5) is cured.

A COMPOSITE PART AND PRODUCTION METHOD THEREOF

Field of the Invention

5 The present invention relates to a patterned composite part and production method thereof.

Background of the Invention

10 In the state of the art, Resin Transfer Molding Method (RTM), open mold (hand lay-up) method, silicone mold method, and many different methods are used to manufacture composite parts. With RTM, parts can be produced in glassy transparency or opaque forms. In RTM, which is generally carried out by connecting a plurality of mold parts that complement each other, the resin is transferred into the obtained mold whole. In this way, composite structures having
15 desired properties on both surfaces are obtained. Unlike RTM, the open mold method is based on the principle of forming a composite structure on a single mold and applying resin by hand lay-up. In the silicone mold method, the final product in the desired form can be obtained by applying silicone on a model.

20 These production techniques can be used by modifying them in the production of patterned parts. What is meant by the production of patterned parts is the preparation of a predetermined image, pattern, logo, picture, photograph or color combination of one or more surfaces of any composite part such that it can be seen by people. The pattern as used herein refers to all types of images mentioned
25 above. During production stage of patterned parts, it is possible to obtain patterned parts with desired visual properties by means of dyeing the said parts by masking with foil in the state of the art. In order to produce the said parts in a healthy and desired form, design works should be carried out before foil laying. However, the use of foil on surfaces which can be considered complex increases
30 the possibility of errors in design works and causes the applications on the surface

not to have a smooth print. Furthermore, both the preliminary design work and the production process of the foiled part take a long time due to their difficulty.

5 If the part is desired to be patterned on both sides, it is required to perform masking by laying foil on both the upper and lower molds. The difficulty of the operations increases in direct proportion to the process. Coloring process in detailed designs is carried out by dyeing in 4-5 steps. This number can increase as the number of colors increases. Additionally, during local retouching of multi-colored patterned parts, local marks remain on the part, and additional processes
10 are required to clean these local marks.

When visual quality is achieved with the method of adhering foil on the finished part, the possibility of being damaged is higher since the adhered foil is close to the surface and it is not compatible with the finished part. Furthermore, in case the
15 parts obtained by this method are deformed for any reason, there is no possibility of repair.

Summary of the Invention

The objective of the present invention is to provide a composite structure
20 comprised of fiber layers, gelcoat layer, patterned layer and resin. With the composite part production method of the present invention, it is possible to apply the desired pattern (patterned layer) directly on the part in the desired form. By this means, it is enabled to significantly shorten the production process in terms of time. It is ensured that the possibility of damage is reduced when it is kept away
25 from the surface by laying the patterned layer between the fiber layers.

Another objective of the present invention is to ensure that the surfaces of the obtained composite part have the desired appearance/pattern. Furthermore, it is possible to retouch the composite parts produced without damaging the
30 appearance/pattern on the surface by means of the method of the present invention.

A further objective of the present invention is to eliminate the disadvantages caused by the foiled design method used in the state of the art. In the patterned composite part of the present invention, thanks to the patterned layer being
5 positioned between the fiber layers, the possibility of damage to the said patterned layer is reduced.

Detailed Description of the Invention

“A Composite Part and Production Method Thereof” developed to fulfill the
10 objective of the present invention is illustrated in the accompanying figures, in which;

Figure 1 is the schematic view of the composite part of the present invention;
wherein

- (a) the patterned layer is positioned under the fiber layer,
- 15 (b) the patterned layer is positioned on top of the fiber layer,
- (c) the patterned layer is positioned between the fiber layers.

Figure 2 is the schematic view of the composite part of the present invention;
wherein

- (a) both top and lower gelcoat layers are transparent,
- 20 (b) the top gelcoat layer is colored and the lower gelcoat layer is transparent,
- (c) the top gelcoat layer is transparent and the lower gelcoat layer is colored,

25 The components shown in the figures are each given reference numbers as follows:

- 1. Composite part
- 2. Gelcoat layer
- 3. Fiber layer
- 30 4. Patterned layer
- 5. Resin

The composite part (1) of the present invention comprises

- at least one gelcoat layer (2),
- 5 - at least one fiber layer (3) which is positioned on the gelcoat layer (2),
- at least one patterned layer which is positioned **between** the fiber layer (3) and the gelcoat layer (2), and which has a pattern thereon desired to be seen from the outside,
- resin (5) which is applied on the layered structure comprised of gelcoat
- 10 layer (2), fiber layer (3), and patterned layer (4), and which enables the said layered structure to be held together after being cured.

The composite part (1) of the present invention comprises

- at least one gelcoat layer (2),
- 15 - at least one fiber layer (3) which is positioned on the gelcoat layer (2),
- at least one patterned layer which is positioned **on the surface of** the fiber layer (3) **away from** the gelcoat layer (2), and which has a pattern thereon desired to be seen from the outside,
- resin (5) which is applied on the layered structure comprised of gelcoat
- 20 layer (2), fiber layer (3), and patterned layer (4), and which enables the said layered structure to be held together after being cured.

The composite part (1) of the present invention comprises

- at least one gelcoat layer (2),
- 25 - **a plurality of** fiber layers (3) which are positioned on the gelcoat layer (2),
- at least one patterned layer which is positioned **between** the fiber layers (3), and which has a pattern thereon desired to be seen from the outside,
- resin (5) which is applied on the layered structure comprised of gelcoat
- 30 layer (2), fiber layer (3), and patterned layer (4), and which enables the said layered structure to be held together after being cured.

In one embodiment of the invention, there is at least one *-more-* gelcoat layer (2) which is applied (positioned) on the resin (5), which is applied on the layered structure comprised of gelcoat layer (2), fiber layer (3), and patterned layer (4), such that it will be on the surface away from the gelcoat layer (2) therein and
5 before the resin (5) is cured.

In a preferred embodiment of the invention, the patterned layer (4) is made of at least one material selected from a group comprising fabric, paper, plastic, metal and combinations thereof.

10

In one embodiment of the invention, the gelcoat layer (2) can be transparent in order to ensure that the pattern on the patterned layer (4) is seen from the outside through the gelcoat layer (2) corresponding to a single surface or both surfaces of the layered structure comprised of the fiber layer (3) and the patterned layer (4). In
15 a different embodiment of the invention, when the gelcoat layer (2) is positioned on both surfaces of the layered structure comprised of the fiber layer (3) and the patterned layer (4), one of these gelcoat layers (2) on one surface can be transparent and the other one on the other surface can be opaque (and preferably colored) so that the pattern on the patterned layer (4) therein can be seen from the
20 outside through a single surface.

A method for the production of patterned composite part (1) comprises the process steps of

- forming at least one gelcoat layer (2) in a mold,
- 25 - laying fiber layer (3) and patterned layer (4) on the gelcoat layer (2) (*such that the patterned layer (4) will be between the fiber layer (3) and the gelcoat layer (2) and/or such that the patterned layer (4) will be positioned on the surface of the fiber layer (3) away from the gelcoat layer (2) and/or such that the patterned layer (4) will be between the fiber layers (3)*),

- applying resin (5) on the layered structure comprised of the gelcoat layer (2), fiber layer (3) and the patterned layer (4) and allowing the resin (5) to be cured,
- removing the structure from the said mold after curing,
- 5 - obtaining the patterned composite part (1) which is the final product.

The invention relates to a patterned composite part (1), which has a layered structure comprised of gelcoat layer (2), fiber layers (3), patterned layer (4) and resin (5), has an attractive appearance by means of the patterned layer (4) and the
10 transparent gelcoat layer (2) allowing the pattern on the patterned layer (4) to be seen from the outside, and enables to eliminate the difficulties experienced in pattern application on the final product thanks to the said layered structure; and a production method thereof.

15 In the production method of the present invention, a mold whole comprising at least one lower mold and at least one upper mold is used. In the said mold, the lower mold and/or the upper mold is coated with gelcoat layers (2). More than one fiber layer (3) can be laid on the gelcoat layer (2) formed on the lower mold. A patterned layer (4) with the desired visual quality is placed on and/or below and/or
20 between the laid fiber layers (3). In the next process step, the mold is closed by coupling the said lower mold and the upper mold. Therefore, the fiber layers (3) and the patterned layer (4) remain between the lower mold and the upper mold. In order to apply the resin (5) to the closed mold and to distribute the applied resin homogeneously, the resin (5) supply channels and vacuum channels are connected
25 to the said closed mold. By this means, the resin (5) is transferred into the mold and the resin (5) is enabled to spread over the mold under negative pressure. After homogenous distribution, the resin (5) is allowed to be cured. Upon the completion of curing, the upper mold and the lower mold are separated and a composite part (1) comprised of gelcoat layer (2), fiber layers (3), patterned layer
30 (4), gelcoat layer (2) and resin (5) is obtained. While the gelcoat layer (2) coating can be applied only on the lower mold or only on the upper mold, it can also be

applied on both molds. At least one of the gelcoat layer (2) coatings applied on the lower mold or the upper mold should be a transparent gelcoat layer (2) coating. In case the transparent gelcoat layer (2) coating is applied on both the lower mold and the upper mold, the patterned layer (4) with the desired visual quality can be
5 seen through both surfaces due to the transparency. However, as another alternative, it is also possible to apply a transparent gelcoat layer (2) to one of the lower and upper molds, while applying a colored gelcoat layer (2) coating to the other. In this case, the patterned layer (4) with the desired visual quality can be seen through only one surface. Heating or heating-cooling processes can be
10 applied to the upper and lower molds used if desired.

In one embodiment of the invention, open mold is used. The said open mold is coated with the gelcoat layer (2) as a surface, and at least one fiber layer (3) is laid on the gelcoat layer (2). The patterned layer (4) with the desired visual quality is
15 placed on or under the laid fiber layers (3). In the following process step, the resin (5) is spread on the structure formed of fiber layers (3) and patterned layer (4), and the said resin (5) is allowed to be cured. Upon completion of curing, the composite part (1) comprised of gelcoat layer (2), fiber layers (3), patterned layer (4) and resin (5) is removed from the mold. In this embodiment of the invention, it
20 is also possible to coat gelcoat layer (2) on the structure formed of laid fiber layers (3) and placed patterned layer (4). If transparent gelcoat layer (2) is applied both on the mold and on the structure formed of fiber layers (3) and patterned layer (4), a composite part (1) is obtained where the patterned layer (4) (in other words, the pattern provided on the said patterned layer (4)) can be seen through both
25 surfaces. However, if transparent gelcoat layer (2) is applied on one of the said surfaces and colored gelcoat layer (2) is applied on the other one, a composite part (1) is obtained where the patterned layer (4) (pattern) can be seen through only one surface. Heating or heating-cooling processes can be applied to the molds used if desired. Furthermore, the said patterned layer (4) can also be placed
30 between the fiber layers (3). For this, it is required to use at least two fiber layers

(3) in the said open mold. This creates an advantage since it reduces the possibility of the patterned layer (4) being damaged.

In a different embodiment of the invention, a mold comprising at least one
5 vacuum bag is used. The said mold is coated with the gelcoat layer (2) and a
plurality of fiber layers (3) is laid on the gelcoat layer (2) formed on the mold.
The patterned layer (4) with the desired visual quality is placed on or under or
between the laid fiber layers (3). In the next process step, a vacuum bag is placed
on top and the mold is covered. In order to apply the resin (5) to the covered mold
10 and to distribute the applied resin (5) homogeneously, the resin (5) supply
channels and vacuum channels are connected to the said covered mold. By this
means, the resin (5) is transferred into the mold and the resin (5) is enabled to
spread over the mold under negative pressure. After homogenous distribution, the
resin (5) is allowed to be cured. Upon completion of curing, the said vacuum bag
15 is separated from the mold, and thus the composite part (1) is obtained. In this
embodiment of the invention, if the transparent gelcoat layer (2) is applied on the
mold, a composite part (1) is obtained wherein the patterned layer (4) (the pattern)
can be seen through both surfaces. Furthermore, the gelcoat layer (2) and the resin
(5) can be applied on the composite part (1) that is removed from the mold. In the
20 invention, while the mold is coated with a transparent gelcoat layer (2), the part
where the vacuum bag is provided can be coated with a colored gelcoat layer (2)
after it is removed from the mold; by this means, a composite part (1) is obtained,
wherein the patterned layer (4) can be seen through only one of its surfaces and its
other surface is coated with the colored gelcoat layer (2). Heating or heating-
25 cooling processes can be applied to the upper and lower molds used if desired.

In a different embodiment of the invention, a mold comprising a silicon bag or a
silicon upper mold is used. The said mold is coated with the gelcoat layer (2) and
a plurality of fiber layers (3) is laid on the gelcoat layer (2) formed on the mold.
30 The patterned layer (4) with the desired visual quality is placed on or under or
between the laid fiber layers (3). After these processes, the silicon bag or the

silicon upper mold is placed on the said mold, and the mold is covered. In order to apply the resin (5) to the covered mold and to distribute the applied resin (5) homogeneously, the resin (5) supply channels and vacuum channels are connected to the said covered mold. By this means, the resin (5) is transferred into the mold
5 under a certain pressure and the resin (5) is enabled to spread over the mold under negative pressure. After homogenous distribution, the resin (5) is allowed to be cured. Upon completion of curing, the silicon upper mold or the silicon bag used in covering the mold is removed from the mold, and thus the composite part (1) is obtained. In this embodiment of the invention, if the transparent gelcoat layer (2)
10 is applied on the mold, a composite part (1) is obtained wherein the patterned layer (4) (the pattern) can be seen through both surfaces. Furthermore, the gelcoat layer (2) and the resin (5) can be applied on the composite part (1) that is removed from the mold. In the invention, while the mold is coated with a transparent gelcoat layer (2), the part where the silicon upper mold or the silicon bag is
15 provided can be coated with a colored gelcoat layer (2) after it is removed from the mold; by this means, a composite part (1) is obtained, wherein the patterned layer (4) can be seen through only one of its surfaces and its other surface is coated with the colored gelcoat layer (2). Heating or heating-cooling processes can be applied to the upper and lower molds used.

20

The composite part (1) which is the subject matter of the invention can be produced based on at least one molding method selected from a group comprised of the resin (5) transfer molding method (RTM), RTM-like methods, hand lay-up method, infusion method, pultrusion method, vacuum bag molding method and
25 silicon bagging method.

In case it is preferred to use resin (5) transfer molding method (RTM), the production method of composite part (1) of the present invention comprises the process steps of

- 30 - forming gelcoat layer (2) in at least one of the molds in the mold whole comprised of at least one lower mold and at least one upper mold,

- laying fiber layer (3) and patterned layer (4) on the formed gelcoat layer (2) *(such that the patterned layer (4) will be between the fiber layer (3) and the gelcoat layer (2) and/or such that the patterned layer (4) will be positioned on the surface of the fiber layer (3) away from the gelcoat layer (2) and/or such*
5 *that the patterned layer (4) will be between the fiber layers (3)),*
- closing the mold whole by coupling the lower mold and the upper mold, and connecting resin (5) supply and vacuum channels to the closed mold whole,
- applying resin (5) through the resin (5) supply channels to the layered
10 structure which is provided inside the mold whole and formed of gelcoat layer (2), fiber layer (3) and patterned layer (4),
- distributing the resin (5) homogeneously in the mold by enabling the resin (5) to spread into the mold with the negative pressure applied through vacuum channels,
- allowing the resin to be cured after it is distributed, and separating the upper
15 mold and the lower mold from each other after curing,
- obtaining the composite part (1) which is the final product.

- In another preferred embodiment of the invention, in case molding process is carried out with hand lay-up method, the method comprises the steps of
- 20 - coating an open mold with gelcoat layer (2),
 - placing fiber layer (3) and patterned layer (4) on the gelcoat layer (2) formed inside the mold,
 - allowing the material to be cured by spreading resin (5) on the layered
25 structure formed of the gelcoat layer (2), fiber layer (3) and the patterned layer (4),
 - obtaining the composite part (1) which is the final product after the curing process.

- In another embodiment of the invention, in case molding with vacuum bag is
30 preferred, the method comprises the steps of

- coating the mold used in production of the composite part (1) with the gelcoat layer (2),
- laying fiber layer (3) and patterned layer (4) on the gelcoat layer (2) formed on the mold,
- 5 - placing the mold vacuum bag after these processes,
- connecting the resin (5) supply and vacuum channels to the mold covered with the vacuum bag,
- transferring the resin (5) therein by means of the negative pressure applied through the said resin (5) supply and vacuum channels,
- 10 - distributing the resin (5) homogeneously in the mold by ensuring that the resin (5) is spread into the mold,
- allowing the resin (5) to be cured after it is spread, and removing the vacuum bag from the mold after curing,
- obtaining the composite part (1) which is the final product after the curing
- 15 process.

In another embodiment of the invention, in case silicon bagging method is preferred, the method comprises the steps of

- coating the lower mold used in production of the composite part (1) with the gelcoat layer (2),
- 20 - laying fiber layers (3) and patterned layer (4) on the gelcoat layer (2) formed on the lower mold,
- placing the silicon bag or the silicon upper mold on the lower mold after these processes,
- 25 - connecting the resin (5) supply and vacuum channels to the lower mold which is covered with the silicon upper mold or the silicon bag,
- supplying resin (5) therein through the said resin (5) supply channels and distributing the resin (5) homogeneously inside the mold by ensuring that the resin (5) is spread into the mold by means of the negative pressure applied
- 30 through the vacuum channels,

- allowing the resin (5) to be cured after it is spread, and removing the silicon upper mold or the silicon bag from the lower mold after curing,
- obtaining the composite part (1) which is the final product after the curing process.

5

In all of the production methods carried out within the scope of the invention and being subjected to different embodiments described above, heating or heating-cooling processes can be applied to the molds for curing the resin (5).

CLAIMS

1. Patterned composite part (1) **comprising**

- at least one gelcoat layer (2),
- 5 - at least one fiber layer (3) which is positioned on the gelcoat layer (2),
- at least one patterned layer which is positioned between the fiber layer (3) and the gelcoat layer (2), and which has a pattern thereon desired to be seen from the outside,
- resin (5) which is applied on the layered structure comprised of gelcoat
- 10 layer (2), fiber layer (3), and patterned layer (4), and which enables the said layered structure to be held together after being cured.

2. Patterned composite part (1) **comprising**

- at least one gelcoat layer (2),
- 15 - at least one fiber layer (3) which is positioned on the gelcoat layer (2),
- at least one patterned layer which is positioned on the surface of the fiber layer (3) away from the gelcoat layer (2), and which has a pattern thereon desired to be seen from the outside,
- resin (5) which is applied on the layered structure comprised of gelcoat
- 20 layer (2), fiber layer (3), and patterned layer (4), and which enables the said layered structure to be held together after being cured.

3. Patterned composite part (1) **comprising**

- at least one gelcoat layer (2),
- 25 - a plurality of fiber layers (3) which are positioned on the gelcoat layer (2),
- at least one patterned layer which is positioned between the fiber layers (3), and which has a pattern thereon desired to be seen from the outside,
- resin (5) which is applied on the layered structure comprised of gelcoat
- 30 layer (2), fiber layer (3), and patterned layer (4), and which enables the said layered structure to be held together after being cured.

4. A patterned composite part (1) according to claim 1, 2, or 3, **characterized by** the patterned layer (4) which is manufactured from at least one material selected from a group comprising fabric, paper, plastic, metal, and combinations thereof.
- 5
5. A patterned composite part (1) according to claim 4, **characterized by** at least one gelcoat layer (2) which is applied (positioned) on the resin (5), which is applied on the layered structure comprised of gelcoat layer (2), fiber layer (3), and patterned layer (4), such that it will be on the surface away from the gelcoat layer (2) here and before the resin (5) is cured.
- 10
6. A patterned composite part (1) according to claim 4 or 5, **characterized by** the gelcoat layer (2) which is transparent in order to ensure that the pattern on the patterned layer (4) can be seen from the outside through the gelcoat layer (2) corresponding to a single surface or both surfaces of the layered structure comprised of the fiber layer (3) and the patterned layer (4).
- 15
7. A patterned composite part (1) according to claim 5, **characterized by** gelcoat layers (2) one of which provided on one surface of the layered structure that is comprised of the fiber layer (3) and the patterned layer (4) is transparent, and the other one of which provided on the other surface is opaque so that the pattern on the patterned layer (4) therein can be seen from the outside through a single surface when the gelcoat layer (2) is positioned on both surfaces of the layered structure.
- 20
- 25
8. A production method for a patterned composite part (1) according to any one of the preceding claims **comprising** the process steps of
- forming at least one gelcoat layer (2) in a mold,
 - laying fiber layer (3) and patterned layer (4) on the gelcoat layer (2),
- 30

- applying resin (5) on the layered structure comprised of the gelcoat layer (2), fiber layer (3) and the patterned layer (4), and allowing the resin (5) to be cured,
 - removing the structure from the said mold after curing,
 - 5 - obtaining the patterned composite part (1) which is the final product.
- 9.** Production method for a patterned composite part (1) according to claim 8, which is carried out based on at least one molding method selected from a group comprised of the resin (5) transfer molding method (RTM), RTM-like methods, hand lay-up method, infusion method, pultrusion method,
- 10 vacuum bag molding method and silicon bagging method.
- 10.** Production method for a patterned composite part (1) according to claim 9, wherein, in case the resin (5) transfer method (RTM) is used as the molding method, the production method comprises the process steps of:
- 15
- forming gelcoat layer (2) in at least one of the molds in the mold whole comprised of at least one lower mold and at least one upper mold,
 - laying fiber layer (3) and patterned layer (4) on the formed gelcoat layer (2),

20

 - closing the mold whole by coupling the lower mold and the upper mold, and connecting resin (5) supply and vacuum channels to the closed mold whole,
 - applying resin (5) through the resin (5) supply channels to the layered structure which is provided inside the mold whole and formed of gelcoat layer (2), fiber layer (3) and patterned layer (4),

25

 - distributing the resin (5) homogeneously in the mold by enabling the resin (5) to spread into the mold with the negative pressure applied through vacuum channels,
 - allowing the resin to be cured after it is distributed, and separating the upper mold and the lower mold from each other after curing,

30

 - obtaining the composite part (1) which is the final product.

11. Production method for a patterned composite part (1) according to claim 9, wherein, in case the hand lay-up method is used as the molding method, the production method comprises the steps of:

- 5
- coating an open mold with gelcoat layer (2),
 - placing fiber layer (3) and patterned layer (4) on the gelcoat layer (2) formed inside the mold,
 - allowing the material to be cured by spreading resin (5) on the layered structure formed of the gelcoat layer (2), fiber layer (3) and the patterned
 - 10 layer (4),
 - obtaining the composite part (1) which is the final product after curing process.

12. Production method for a patterned composite part (1) according to claim 9, wherein, in case molding with vacuum bag is used as the molding method, the production method comprises the steps of:

- 15
- coating the mold used in production of the composite part (1) with the gelcoat layer (2),
 - laying fiber layer (3) and patterned layer (4) on the gelcoat layer (2)
 - 20 formed on the mold,
 - placing the mold vacuum bag after these processes,
 - connecting the resin (5) supply and vacuum channels to the mold covered with the vacuum bag,
 - transferring the resin (5) therein by means of the negative pressure
 - 25 applied through the said resin (5) supply and vacuum channels,
 - distributing the resin (5) homogeneously in the mold by ensuring that the resin (5) is spread into the mold,
 - allowing the resin (5) to be cured after it is spread, and removing the vacuum bag from the mold after curing,
 - 30 - obtaining the composite part (1) which is the final product after curing process.

13. Production method for a patterned composite part (1) according to claim 9, wherein, in case silicon bagging method is used as the molding method, the production method comprises the steps of:

- 5
- coating the lower mold used in production of the composite part (1) with the gelcoat layer (2),
 - laying fiber layers (3) and patterned layer (4) on the gelcoat layer (2) formed on the lower mold,
 - placing the silicon bag or the silicon upper mold on the lower mold after

10 these processes,

 - connecting the resin (5) supply and vacuum channels to the lower mold which is covered with the silicon upper mold or the silicon bag
 - supplying resin (5) therein through the said resin (5) supply channels and distributing the resin (5) homogenously inside the mold by ensuring that

15 the resin (5) is spread into the mold by means of the negative pressure applied through the vacuum channels,

 - allowing the resin (5) to be cured after it is spread, and removing the silicon upper mold or the silicon bag from the lower mold after curing,
 - obtaining the composite part (1) which is the final product after curing

20 process.

14. Production method for a patterned composite part (1) according to any one of the claims 10 to 13, wherein heating is applied to the molds in order to cure the resin (5).

25

15. Production method for a patterned composite part (1) according to any one of the claims 10 to 13, wherein heating-cooling is applied to the molds in order to cure the resin (5).

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1/2

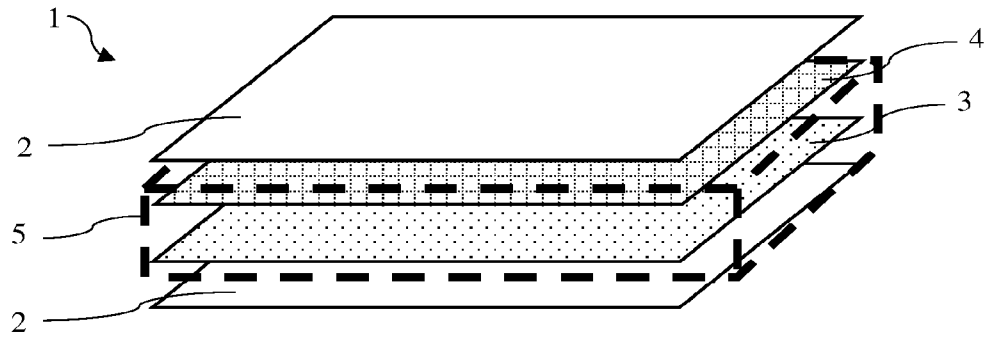


Figure 1 (a)

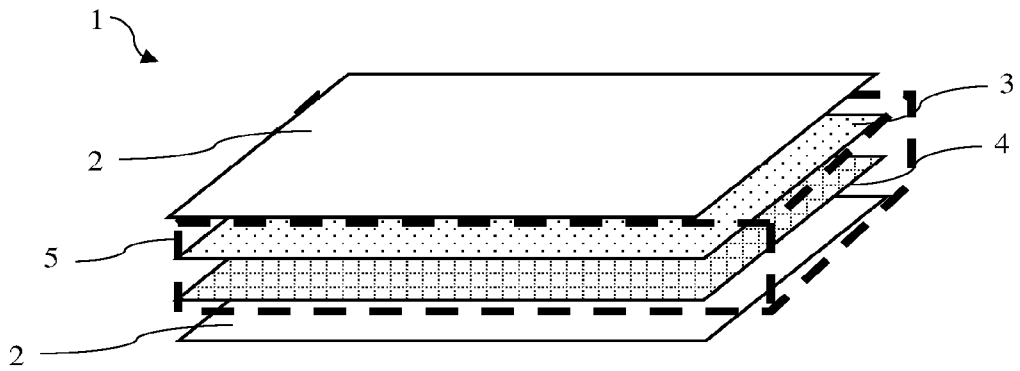


Figure 1 (b)

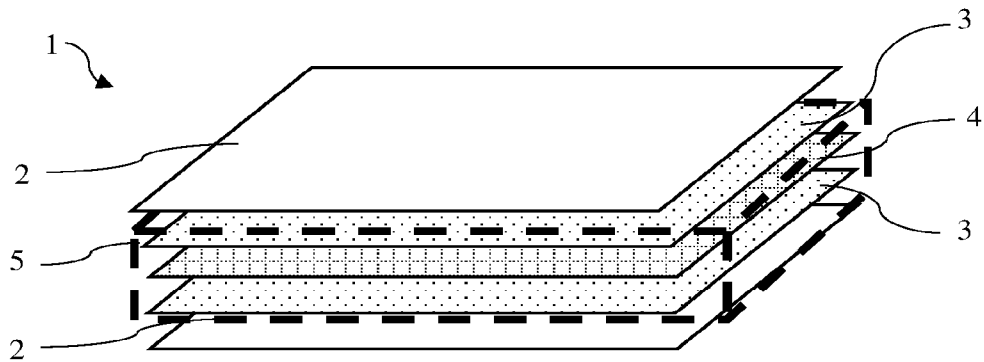


Figure 1 (c)

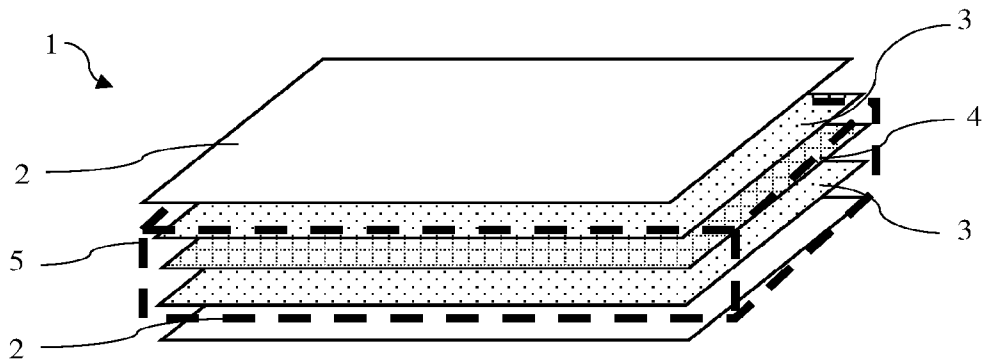


Figure 2 (a)

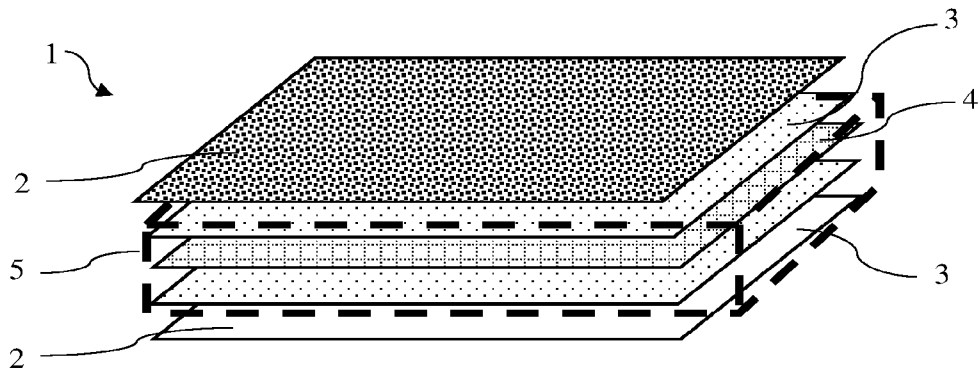


Figure 2 (b)

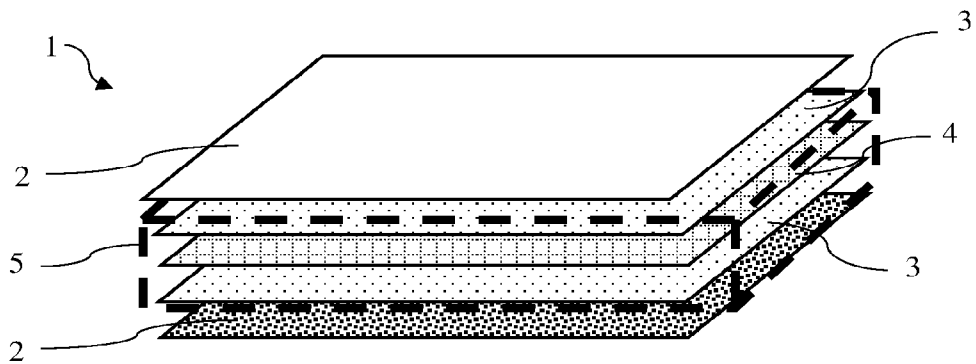


Figure 2 (c)

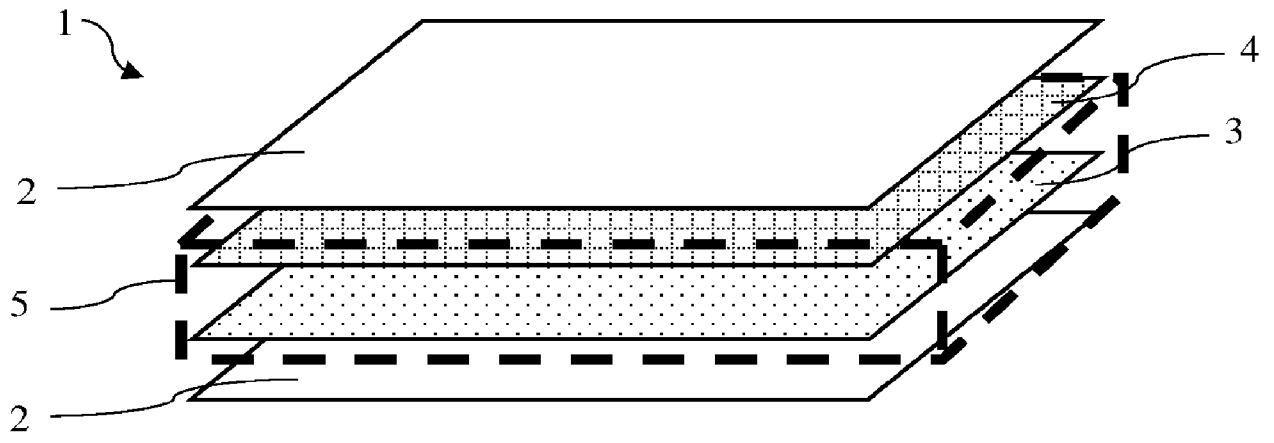


Figure 1 (a)

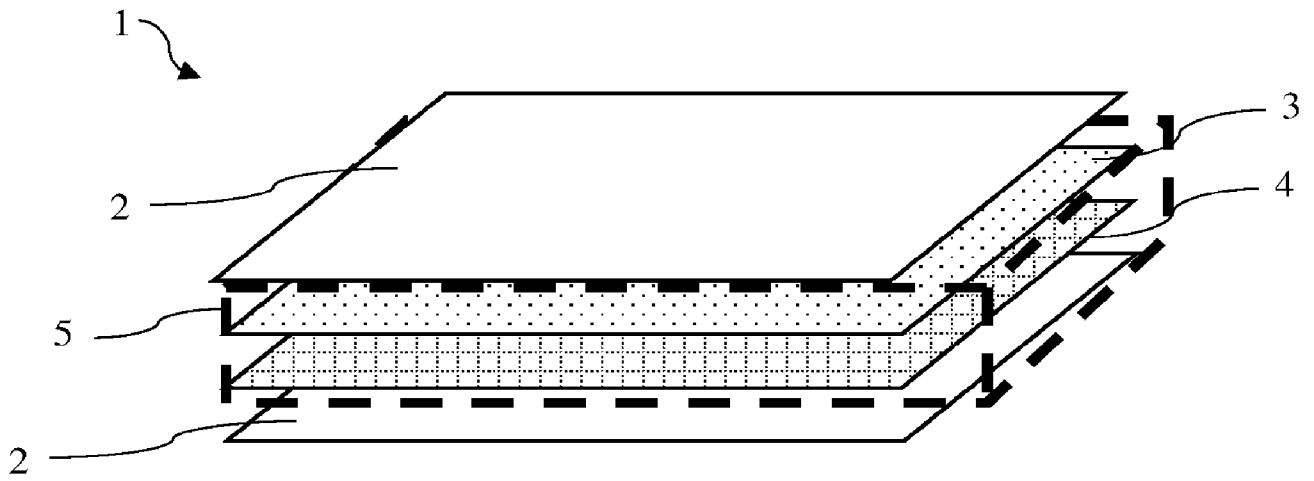


Figure 1 (b)

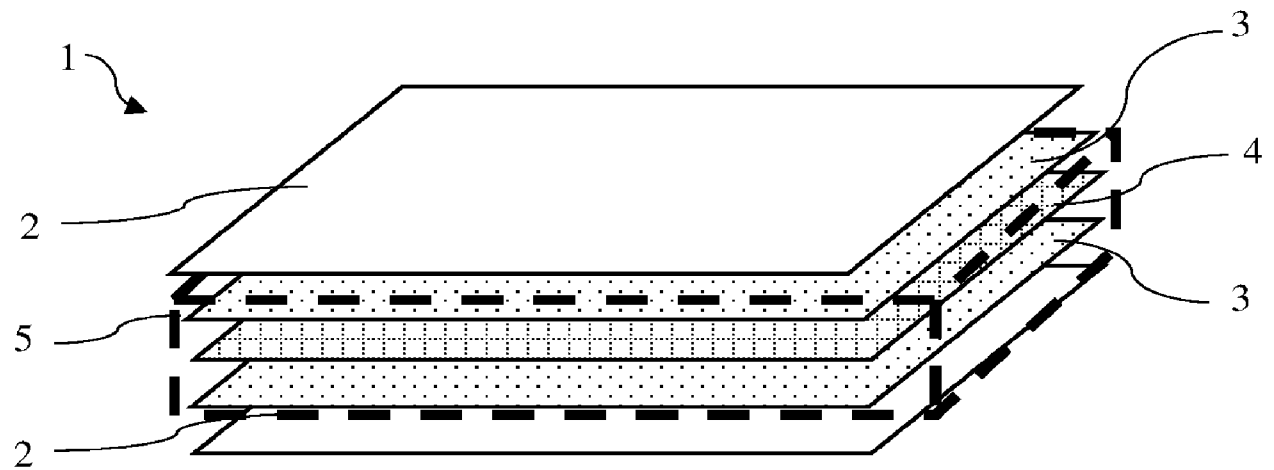


Figure 1 (c)