A contribution to solving the aforementioned objects is made by a component, ~~in particular a membrane,~~ comprising a composite of at least two layers that are connected to each other, whereby

a. the first layer comprises at least one hole;

b. the second layer comprises a thickness in the range of 1 to 50 µm, ~~preferably of 1 to 40 µm, or of 1 to 30 µm, or of 1 to 15 µm~~; and

whereby the first layer and the second layer each comprise at least one metal and

whereby the composition of the first layer differs from the composition of the second layer.

A contribution to solving the aforementioned objects is made by a method for producing a component comprising a composite made of at least two layers that are connected to each other,

whereby the second layer comprises a thickness in the range of 1 to 50 µm;

whereby the first layer and the second layer each comprise at least one metal;

whereby the third layer comprises a thickness of at least 1 µm;

whereby the composition of the first layer differs from the composition of the second layer;

comprising at least the following process steps:

i. providing, superimposing, and connecting the first layer and a second layer while forming a composite;

ii. applying a coating SL onto a part of the first layer;

iii. contacting parts of the first layer not provided with the coating to a liquid CA;

iv.

whereby the contacting causes at least a part of the first layer to be removed and at least one hole to be formed in the first layer;

whereby the component is being obtained.

A contribution to solving the aforementioned objects is made by a method for producing a component comprising a composite made of at least three layers that are connected to each other,

whereby the second layer comprises a thickness in the range of 1 to 50 µm;

whereby the first layer, the second layer and the third layer each comprise at least one metal;

whereby the third layer comprises a thickness of at least 1 µm;

whereby the composition of the first layer differs from the composition of the second layer;

whereby the composition of the third layer differs from the composition of the first layer;

comprising at least the following process steps:

i. providing, superimposing, and connecting the third layer, first layer and second layer while forming a composite;

ii. removing a part of the third layer;

iii. contacting parts of the first layer not provided with the third layer to a liquid CA;

whereby the contacting causes at least a part of the first layer to be removed and at least one hole to be formed in the first layer;

whereby the component is being obtained.

In the spirit of the present application, a hole shall be understood to be a region of a layer, in which said layer is discontinuous throughout its entire thickness, whereby the hole is bordered in the plane of the layer by a margin made of layer.

In the spirit of the present application, continuous shall be understood to mean that the object thus specified or the region of a layer thus specified does not comprise a hole, a gap of materials or the like. Yet an object specified as being continuous can comprise variations of its thickness, whereby said thickness is always larger than zero.

The thickness of the layer is the extension of that layer perpendicular to a plane that can be placed in the layer, at the measuring location. If the measurement of the thickness of a layer at multiple locations yields different values, the thickness shall be the arithmetic mean of the measured values. If the layer forms a tube, the tangential plane at the measuring location on the tube shall be understood to be the plane in the layer.

In the spirit of the present invention, impervious shall be understood to mean that a liquid, in particular water, or a gas, in particular helium, cannot pass through the object specified as being impervious at a pressure applied to said object in the range of 0 to 30,000 Pa. The imperviousness is measured by means of a tightness test of the object with helium (so-called "helium leakage test") according to the MIL-STD-883H standard, method 1014.13, test condition A_4.

Description of the figures

Figure 1 shows a process for producing a composite 6 from two layers 2 and 3. Said process can be run continuously or discontinuously. In step a, a first layer 2 and a second layer 3 are provided and superimposed. In step b, the two layers 2 and 3 are connected intimately by guiding them between rollers 11. The rolling reduces the thickness of the layers 2 and 3 (not shown here). The resulting composite 6 is shown in c.

Figure 2 shows a process for producing a composite 6 made of three layers 2, 3, and 8. Said process can be run continuously or discontinuously. In step a, a third layer 8, a first layer 2, a second layer 3 are provided and superimposed. In step b, the threetwo layers 8, 2, and 3 are connected intimately by guiding them between rollers 11. The rolling reduces the thickness of the layers 8, 2, and 3 (not shown here). The resulting composite 6 is shown in c.

Figure 3 shows an option for producing a component comprising a support layer and a membrane. Image a shows a composite 6 made of two layers 2 and 3. This is being coated with a coating SL 5. A hole 7 is formed in the coating SL 5 by removing a part of the coating SL 5. In image b, the coating SL 5 now comprises a hole 7, which is subsequently immersed in a bath 13 of a liquid 12. Image c shows an arrangement, in which the composite 6 with the hole 7 in the coating SL 5 is being treated with a liquid CA 12 in a bath 13. Afterwards, the liquid CA is being removed, e.g. by rinsing. Image d shows the treated composite 6. It comprises a hole 7 that is present both in layer 5 and in layer 6. Image e shows the composite 6 after the coating SL 5 has been removed.

Figure 4 shows a process on which the images from Figure 3 are based.

Figure 5 shows another option for producing a component comprising a support layer and a membrane. Here, the composite consists of three layers, whereby the third layer 8 is resistant to the liquid CA. Image a shows the composite 6 made of three layers 2, 3 (both not shown), and 8. A hole 7 is formed in said composite 6. In image b, the composite 6 comprises a hole 7, which is subsequently immersed in a bath 13 containing a liquid 12. Image c shows an arrangement, in which the composite 6 with

the hole 7 in layer 8 is being treated with a liquid CA 12 in a bath 13. Afterwards, the liquid CA is being removed, e.g. by rinsing. Image d shows the treated composite 6. It comprises a hole 7 that is present both in layer 8 and in layer 6. Optionally, layer 8 is removed. Image e shows the composite 6 after layer 8 has been removed.

Figure 6 shows a process on which the images from Figure 5 are based.

Figure 7 shows examples of components, each comprising a composite made of two layers.

Line 1 shows a cross-section each, line 2 shows a top view onto the components each. Figure 7a shows a circular component with a planar membrane (second layer 3) and a cylindrical ring made of the first layer 2. Figure 7b shows a rectangular component with a planar membrane (second layer 3) and a rectangular frame made of the first layer 2. Figure 7c shows a cylindrical component with a domed membrane as part of the second layer 3 that forms an internal cylinder and with a ring made of the first layer 2 forming an external cylinder.

Figure 8 shows an example of a device 10 (shown dashed) comprising a component ~~(~~1~~)~~ with a composite made of a first layer 2 and a second layer 3.

Claims

1. A component (1) comprising a composite (6) made of at least two layers (2) and (3) that are connected to each other, whereby
   a. the first layer (2) comprises at least one hole (7);
   b. the second layer (3) comprises a thickness in the range of 1 to 50 µm; and
   whereby the first layer (2) and the second layer (3) each comprise at least one metal; and
   whereby the composition of the first layer (2) differs from the composition of the second layer (3).

2. Component (1) according to claim 1, whereby the second layer (3) comprises a thickness in the range of 2.0 up to 25 µm.

3. Component (1) according to any one of the preceding claims, whereby the first layer (3) comprises a thickness in the range of 50 up to 500 µm.

4. Component (1) according to any one of the preceding claims, whereby the first layer (2) and the second layer (3) are connected by means of cold welding or roll cladding.

5. Component (1) according to any one of the preceding claims, whereby the materials of the ~~first and the second layer (2)~~first layer (2) and the second layer (3) are biocompatible.

6. Component (1) according to any one of the preceding claims, whereby the at least one metal of the first layer (2) is selected from the group consisting of silver, gold, platinum, titanium, iridium, niobium, tantalum, tungsten, palladium, copper, iron, a steel or a combination of at least two thereof.

7. Component (1) according to any one of the preceding claims, whereby the at least one metal of the second layer (3) is selected from the group consisting of

silver, gold, platinum, titanium, iridium, niobium, tantalum, tungsten, ~~tungsten,~~ palladium, a steel, or a combination of at least two thereof.

8. Component (1) according to any one of the preceding claims, whereby the metal or metals of the first layer (2) is or are different from the metal or metals of the second layer (3).

9. Component (1) according to any one of the preceding claims, whereby a diffusion layer (4) is arranged as connection between the first layer (2) and the second layer (3).

10. Component (1) according to any one of the preceding claims, whereby a third layer (8) is arranged on the side of the first layer (2) facing away from the second layer (3) and comprises at least one hole (9), whereby each hole (7) of the first layer has a hole (9) of the third layer superimposed on it.

11. A method for producing a component (1) comprising a composite (6) made of at least two layers (2) and (3) that are connected to each other,
whereby the second layer (3) comprises a thickness in the range of 1 to 50 µm;
whereby the first layer (2) and the second layer (3) each comprise at least one metal;
whereby the third layer comprises a thickness of at least 1 µm;
whereby the composition of the first layer (2) differs from the composition of the second layer (3);
comprising at least the following process steps:
i. providing, superimposing, and connecting the first layer (2) and a second layer (3) while forming a composite (6);
ii. applying a coating SL (5) onto a part of the first layer (2);
iii. contacting parts of the first layer (2) not provided with the coating to a liquid CA;