external power supply is also problematic for various applications.

Certain bacteria may also be undesirable because they cause effects that are unpleasant for humans. This includes, for example, the odor of sweat, which is caused by the bacterial breakdown of fatty acids present in sweat.

It is an object of the present disclosure to propose an article or a device which has an antibacterial effect without the input of electrical energy, and to provide a method for the production thereof. In the context of the present disclosure, the phrase “antibacterial effect” should be taken to mean an inhibitory or destructive effect on representatives of at least one of the following categories: microorganisms, in particular anaerobic mesophilic microorganisms, pathogenic microorganisms, bacteria, viruses, fungi and algae.

This object is achieved by an article with an antibacterial finish and by a method for the production thereof according to the features as defined herein.

In electrically highly conductive metals such as silver and copper, the mobility of valence electrons is comparatively high. For simplicity, this is also referred

to as an electron sea. This promotes the formation of free radicals.

In one aspect, the present disclosure relates to an article with an antibacterial finish comprising at least one electrically nonconductive substrate with at least one surface portion coated with particles of at least one further metal, characterized in that the surface portion is coated with particles of titanium, the particles of titanium having the effect of a binder between the substrate and the particles of the at least one further metal, and that the particles of titanium and the particles of the at least one further metal are arranged in various combinations in clusters and are electrically conductively connected together within such clusters, and in that the clusters are arranged on the substrate at a distance from each other in the manner of islands and electrically insulated from each other.

In another aspect, the present disclosure relates to a method for producing an article with an antibacterial finish, this article comprising at least one electrically nonconductive substrate, characterized in that at least one portion of the surface of substrate is coated in a sputtering installation by sequential sputtering of particles of titanium and at least one further metal, the sputtered particles of titanium having the effect of a

binder between the substrate and the particles of the at least one further metal, and the particles of titanium and the particles of the at least one other metal being deposited in various combinations in clusters on the respective surface portion of the substrate and, within these clusters, being electrically conductively connected together, and the clusters being arranged on the substrate at a distance from each other in the manner of islands and electrically insulated from each other.

Claims

1. An article with an antibacterial finish comprising at least one electrically nonconductive substrate with at least one surface portion coated with particles of at least one further metal, characterized in that the surface portion is coated with particles of titanium, the particles of titanium having the effect of a binder between the substrate and the particles of the at least one further metal, and that the particles of titanium and the particles of the at least one further metal are arranged in various combinations in clusters and are electrically conductively connected together within such clusters, and in that the clusters are arranged on the substrate at a distance from each other in the manner of islands and electrically insulated from each other.

2. The article with an antibacterial finish according to Claim 1, characterized in that the average cluster size is smaller than 100 nm.

3. The article with an antibacterial finish according to either one of Claims 1 or 2, characterized in that the further metal or metals is/are selected from a group comprising silver, copper, gold, iron and nickel.

4. The article with an antibacterial finish according to any one of Claims 1 to 3, one of the further metals being silver, characterized in that the coated mass of silver particles per m^2 of surface in the coated surface region of the substrate is in the range from 50 mg to 100 mg.

5. The article with an antibacterial finish according to any one of Claims 1 to 4, characterized in that the substrate is coated with titanium, silver and copper, and in that the ratio of the number of particles of copper:silver is in the range from 1:2 to 1:6.

6. The article with an antibacterial finish according to any one of Claims 1 to 4, characterized in that the substrate is coated with titanium, copper and gold, in that the ratio of the number of particles of copper:silver is in the range from 1:2 to 1:4, and in that the ratio of the number of particles of copper:gold is in the range from 2:1 to 8:1.

7. The article with an antibacterial finish according to any one of Claims 1 to 6, characterized in that the substrate is a textile or non-textile sheet structure (3) with a porous fiber structure.

8. The article with an antibacterial finish according to any one of Claims 1 to 7, characterized in that this article is a filter cartridge, an air filter, a protective mask, a wound dressing, a garment, an insole, a cleaning cloth or an antiseptic pad, and in that at least one ply of the substrate is arranged on the surface of this article or is embedded in the article.

9. The article with an antibacterial finish according to Claim 8, this article being a filter cartridge (21), characterized in that this filter cartridge (21) comprises a cylindrical inner filter element (27) and, coaxially thereto, a cylindrical outer filter element (29) which together delimit a receiving space (30) for an active substance, and in that each of the filter elements (27, 29) comprises one or more plies of the coated substrate.

10. A method for producing an article with an antibacterial finish, this article comprising at least one electrically nonconductive substrate, characterized in that at least one portion of the surface of substrate is coated in a sputtering installation by sequential sputtering of particles of titanium and at least one further metal, the sputtered particles of titanium having the effect of a binder

between the substrate and the particles of the at least one further metal, and the particles of titanium and the particles of the at least one other metal being deposited in various combinations in clusters on the respective surface portion of the substrate and, within these clusters, being electrically conductively connected together, and the clusters being arranged on the substrate at a distance from each other in the manner of islands and electrically insulated from each other.