(57) Abrégé/Abstract:
The invention relates to a method for treating the surface of aluminum components or components comprising aluminum, comprising anodizing the surface; introducing at least one pigmenting substance, and/or oxidizable substance into depressions or pores open on the surface created by the anodizing process; applying a ceramic thin-film coating or siliceous sol-gel coating onto the surface, wherein the ceramic thin-film coating or the sol-gel coating comprises a pigment particularly serving refraction purposes.
Abstract

The invention relates to a method for treating the surface of aluminum components or components comprising aluminum, comprising anodizing the surface; introducing at least one pigmenting substance, and/or oxidizable substance into depressions or pores open on the surface created by the anodizing process; applying a ceramic thin-film coating or siliceous sol-gel coating onto the surface, wherein the ceramic thin-film coating or the sol-gel coating comprises a pigment particularly serving refraction purposes.
Treatment of a Surface of an Aluminum or Aluminum-containing Component

The invention relates to an aluminum component or a component comprising aluminum, the surface thereof being treated, particularly provided with one or more coating layers.

When treating the surfaces of components of this type, optical interference may occur, which creates the impression of an uneven, and consequently optically unappealing surface structure.

It is therefore the object of the invention to create a method for treating the surfaces of aluminum components or components comprising aluminum, wherein the components despite surface treatment create an optically appealing, particularly interference-free impression by means of one or more coating layers.

This object is achieved according to the invention in that the surface of the aluminum component or the component comprising aluminum is first anodized. In this way, a comb or pore structure is created on the surface, the structure having depressions or pores that are open toward the outside. Subsequently, at least one pigmenting substance, particularly a fully pigmenting substance, is introduced into the depressions or pores. Alternatively or additionally, substances, particularly metal substances, are introduced into the depressions or pores, particularly by means of a deposition method in a bath, followed by an oxidation step of the substances, particularly by applying electric current. The substances are consequently adjusted in their color, wherein “colorless” is also possible. Thereafter, at least one coating layer is applied to the surface, particularly a ceramic thin-film coating or preferably a siliceous sol-gel coating, wherein the coating layer, particularly the ceramic thin-film coating or preferably the sol-gel coating, comprises a pigment, which serves refraction purposes. As a result, a coating is used, which is provided with such a pigment. By pigmenting the depressions or pores and/or coloring the same with the oxidized substances and by pigmenting the coating, no optical interference occurs so that a surface treated in this manner appears completely even.

According to a further development of the invention, it is provided that the ceramic thin-film coating or the sol-gel coating is applied in a layer thickness of 0.5 μm to 5 μm. In this way, particularly good results can be achieved.

According to a further development of the invention, it is provided that an inorganic pigment is used as the pigment present in the sol-gel coating. The pigmenting substance
to be introduced into the depressions or pores may comprise a pigment, which is likewise inorganic.

Furthermore, it is advantageous to configure the pore structure as a fine pore structure.

According to a further development of the invention, a pigmenting substance and/or a pigment having an arbitrary color, or each having an arbitrary color, particularly a transparent color is used. Accordingly, arbitrarily different, or also equivalent colors, particularly colorless pigments, can be used for the pigmenting substance and/or the pigment.

The invention further relates to a component made of aluminum or comprising aluminum, which is produced by the method according to the above description.

The invention relates to an aluminum component or a component comprising aluminum. The surface of the component is anodized, which is to say that an oxide layer is formed on the surface. This process is performed until a comb or pore structure forms on the surface of the components (viewed microscopically). The comb or pore structure is not closed, but is configured open toward the top. For coloring purposes, at least one pigmented substance can be introduced into the depressions of this comb or pore structure, particularly fine pore structure. Any arbitrary color, but also a transparent color, may be used as the pigment color. Alternatively or additionally, for coloring the depressions of this comb or pore structure, particularly fine pore structure, a color or a color spectrum can be adjusted on the surface by means of deposition methods and oxidation methods, particularly by means of electric current, depending on the deposition product used, particularly metal substances. Alternatively or in addition to a color design, a transparent color is also conceivable. Thereafter, a ceramic thin-layer coating or a siliceous sol-gel coating is applied onto the anodized surface, wherein the ceramic thin-layer coating or sol-gel coating is provided with a low volume percentage of 0.1 to 0.01 of a preferably inorganic pigment before or during the coating process. By adding this pigment, which may likewise be configured in any arbitrary color or may also be transparent, interference formation is prevented, which is to say the different layers on the component do not cause any optical interference effects. The ceramic thin-film coating or sol-gel coating is cured by the application of heat.

The layer thickness of the ceramic thin-film coating or siliceous sol-gel coating is preferably 0.5 µm to 5 µm.
Before applying the ceramic thin-film coating or sol-gel coating and/or before or after introducing the pigmented substance and/or the oxidizable substances into the pores for coloring purposes, optionally also a compacting step may be performed such that the pores in the upper region constrict, but do not close. The compacting step may in particular be performed by hydrating.
CLAIMS

1. A method for treating the surface of aluminum components or components comprising aluminum, by performing the following steps:

   anodizing the surface
   introducing at least one pigmenting substance, particularly fully pigmenting substance, into depressions or pores open toward the surface of a comb or pore structure of the surface created by the anodizing process, and/or
   introducing oxidizable substances into depressions or pores open toward the surface of a comb or pore structure of the surface created by the anodizing process and oxidizing these substances,
   applying a ceramic thin-film coating or siliceous sol-gel coating onto the surface, wherein the ceramic thin-film coating or the sol-gel coating comprises a pigment particularly serving refraction purposes.

2. The method according to claim 1, characterized in that the ceramic thin-film coating or the sol-gel coating is applied in a layer thickness of 0.5 µm to 5 µm.

3. A method according to any one of the preceding claims, characterized in that an inorganic pigment is used as the pigment present in the ceramic thin-film coating or sol-gel coating.

4. A method according to any one of the preceding claims, characterized in that the pore structure is configured as a fine pore structure.

5. A method according to any one of the preceding claims, characterized in that a pigmenting substance and/or a pigment having an arbitrary color, or each having an arbitrary color, particularly a transparent color, is used.

6. A method according to any one of the preceding claims, characterized in that before applying the ceramic thin-film coating or sol-gel coating, a compacting step of the comb or pore structure, particularly by means of hydrating, is performed.
7. A component made of aluminum or comprising aluminum, produced by the method according to any one or more of the preceding claims.