Claims

1. Method for the application of a titanium aluminide alloy comprising a gamma phase proportion of at least 50 vol.% based on the overall composition of the titanium aluminide alloy on a substrate, the method comprising the following steps:

   a) Pretreatment of the substrate surface;

   b) Heat treatment of titanium aluminide powder particles at a temperature range of 600 to 1000°C in order to increase the proportion of the gamma phase;

   c) Cold spraying of the heat-treated powder particles onto the substrate or a part of the substrate to form a layer of titanium aluminide; and

   d) Thermal post-treatment of the layer of titanium aluminide applied to the substrate.

2. Method according to claim 1, characterized by the titanium aluminide alloy having a gamma phase proportion of at least 55 vol.%, preferably at least 60 vol.%, even more preferably 80 vol.% based on the overall composition of the titanium aluminide alloy.

3. Method according to claim 1 or 2, characterized by the substrate having a substrate surface selected from titanium aluminide alloy, nickel alloy, titanium alloy or combinations of these alloys.

4. Method according to one of claims 1 to 3, characterized by the pretreatment of the substrate surface being selected from polishing, roughness blasting, high pressure water blasting, chemical etching or combinations thereof.

5. Method according to one of claims 1 to 4, characterized by the heat treatment of the powder particles being carried out in a protective gas atmosphere or in a vacuum.

6. Method according to one of claims 1 to 5, characterized by the heat treatment being carried out for a period of 0.5 to 5 hours.

7. Method according to one of claims 1 to 6, characterized by the heat treatment being carried out in a temperature range from 620 to 900°C, more preferably from 650 to 850°C.

8. Method according to one of claims 1 to 7, characterized in that the heat treatment is carried out for 1 to 3 hours in a protective gas atmosphere or in a vacuum of less than 10^{-5} mbar in a temperature range of 650 to 850°C.

9. Method according to one of claims 1 to 8, characterized by the size of the powder particles being in a range from 10 to 70 µm.

10. Method according to one of claims 1 to 8, characterized by the average powder particle diameter being less than 45 µm.

11. Method according to one of claims 1 to 10, characterized by the powder particles being spherical.

12. Method according to one of claims 1 to 11, characterized by the thermal aftertreatment being a hot isostatic pressing or a diffusion annealing.

13. Method according to one of claims 1 to 12, characterized by the titanium aluminide alloy comprising the gamma phase and the alpha2 phase and by a ratio of the gamma phase to the alpha2 phase in the titanium aluminide alloy being in a range from 50:50 to 99:1 vol.%, more preferably from 55:45 to 90:10 vol.%, even more preferably from 60:40 vol.% to 80:20 vol.%.