Claims

1. A method for applying an aluminide coating, comprising:

providing a component having an external section and an internal section, said internal section characterized by one or more internal surfaces defining an internal cavity;

providing an elongated member defined at least in part by a size and shape corresponding to the internal section of the component;

applying an aluminum-based slurry onto said elongated member;

introducing said member through an opening of said component;

positioning said member within said cavity at a location that is spaced apart from each of the one or more internal surfaces;

applying heat to the component and the member;

generating vaporized aluminum within said internal section;

directing the vaporized aluminum towards the one or more internal surfaces;

diffusing vaporized aluminum into the one or more surfaces; and

reacting the aluminum with the one or more surfaces to form the aluminide coating.

2. The method of claim 1, further comprising the step of maintaining the elongated member in a stationary configuration.

3. The method of claim 1, further comprising removing the elongated member after formation of the aluminide coating.

4. The method of claim 1, wherein said external section is coated during formation of said aluminide coating along the one or more internal surfaces of the internal section of the component.

5. The method of claim 1, wherein said aluminum-based slurry comprises a halide activator and a binder each of which is in a volatized state after the step of applying heat to the component and the member.

6. The method of claim 5, wherein at least a portion of said volatized binder and volatized halide activator are removed from the internal cavity prior to said binder and activator contacting said one or more internal surfaces.

7. The method of claim 1, wherein said aluminum-based slurry comprises an aluminum donor material, said aluminum donor material selected from the group consisting of aluminum and aluminum alloys.

8. The method of claim 7, wherein said aluminum alloys are selected from the group consisting of chrome aluminum, cobalt aluminum and silicon aluminum.

9. The method of claim 1, wherein said elongated member is coated with the aluminum-based slurry prior to the introduction of said member into the component.

10. The method of claim 9, wherein said slurry is cured to form an aluminum-based coating.

11. The method of claim 1, wherein said elongated member does not make contact with any of the one or more internal surfaces during formation of the aluminide coating.

12. A method for applying an aluminide coating, comprising:

providing a component having an external section and an internal section, said internal section characterized by one or more internal surfaces defining a first internal cavity and a second internal cavity;

providing a first elongated member defined at least in part by a size and shape corresponding to the first internal cavity;

applying a first aluminum-based slurry onto said first elongated member;

providing a second elongated member defined at least in part by the size and shape corresponding to the second internal cavity;

applying a second aluminum-based slurry onto said second elongated member;

introducing said first elongated member into said first internal cavity;

positioning said first member within said first cavity at a first location that is spaced apart from each of the one or more internal surfaces defining the first internal cavity;

introducing said second elongated member into the second internal cavity;

positioning said second elongated member within said cavity at a second location that is spaced apart from each of the one or more internal surfaces defining the second internal cavity;

applying heat to the component, the first and the second elongated members;

generating a first vaporized aluminum and a second vaporized aluminum within each of said first and second internal cavities, respectively;

directing the first and the second vaporized aluminum towards the one or more internal surfaces;

diffusing the first and the second vaporized aluminum into the one or more surfaces; and

reacting the first vaporized aluminum with the one or more surfaces defining the first internal cavity to form a first aluminide coating; and

reacting the second vaporized aluminum with the one or more surfaces defining the second internal cavity to form a second aluminide coating.

13. The method of claim 12, wherein said first aluminide coating is produced at a first rate having a first thickness, and said second aluminide coating is produced at a second rate having a second thickness.

14. The method of claim 12, further comprising a step of maintaining each of said first and second elongated members in a fixed configuration during production of the first and the second aluminide coatings.

15. The method of claim 12, wherein said first and second members do not make contact with any of the internal surfaces during production of the first and the second aluminide coatings.

16. The method of claim 12, further comprising withdrawing the first elongated member and the second elongated member after formation of the first and the second aluminide coatings.

17. The method of claim 12, wherein said formation of said first aluminide coating on said first internal cavity and formation of said second aluminide coating on said second internal cavity occurs during coating of the external section.

18. The method of claim 12, wherein said first aluminum-based slurry comprises a first halide activator and a first binder, and wherein said second aluminum-based slurry comprises a second halide activator and a second binder.

19. The method of claim 18, wherein each of said first binder and first halide activator volatizes, and each of said second binder and second halide activator volatizes.

20. The method of claim 19, wherein at least a portion of said first volatized binder and said first volatized halide activator are removed from the first internal cavity prior to contact of the internal surfaces of the first internal cavity, and further wherein at least a portion of said second volatized binder and said second volatized halide activator are removed from the second internal cavity prior to contact of the internal surfaces of the second internal cavity.