CLAIMS

1. A method for coating a component of a plasma processing chamber, wherein the method comprises:

providing a component body;

aerosol depositing a coating of a powder mixture of an yttrium oxide powder and an aluminum-containing powder onto at least one surface of the component body, wherein the coating has an yttrium to aluminum ratio of 4:1 to 1:4 by molar number; and

annealing the coating at a temperature of at least 900° C to increase a porosity of the coating and to form the coating into a porous ternary oxide coating.

2. The method, as recited in claim 1, wherein the porous ternary oxide is one or more of YAG, YAM or YAP.

3. The method, as recited in claim 1, wherein the component body is made of a ceramic material.

4. The method, as recited in claim 1, wherein the aluminum-containing powder comprises aluminum powder or aluminum oxide powder.

5. The method, as recited in claim 1, wherein the component body forms a dielectric window.

6. A component of a plasma processing chamber, comprising a component body having a coating on a surface of the component body, wherein the coating comprises a porous ternary oxide having a porosity of 5-20%, wherein the porous ternary oxide has a composition obtained by annealing a powder mixture of an yttria powder and an aluminum-containing powder.

7. The component as recited in claim 6, wherein the ternary oxide is one or more of YAG, YAM, and YAP.

8. The component as recited in claim 6, wherein the component body is formed of a ceramic material.

9. The component as recited in claim 6, wherein the component body is formed of a silicon material.

10. The component as recited in claim 6, wherein the aluminum-containing powder comprises aluminum powder or aluminum oxide powder.

11. The component as recited in claim 6, wherein the component body forms a

dielectric window.

12. The component as recited in claim 6, wherein the coating has a porosity in a range of 10-20%.

13. The component as recited in claim 6, wherein the coating has a porosity in a range of 5-10%.

14. The component as recited in claim 6, wherein the coating has an yttrium to aluminum ratio of 4:1 to 1:4 by molar number.

15. A porous coating on a surface of the component body of a plasma processing chamber, having a composition obtained by annealing a powder mixture of an yttrium oxide powder and an aluminum-containing powder, wherein annealing increases the porosity of the coating.

16. The coating as recited in claim 15, wherein the coating is a porous ternary oxide, wherein the porous ternary oxide comprises one of YAG, YAM, and YAP.

17. The coating as recited in claim 15, wherein the aluminum-containing powder comprises aluminum powder or aluminum oxide powder.

18. The coating as recited in claim 15, wherein the coating has a porosity in a range of 1-20%.

19. The coating as recited in claim 15, wherein the coating has a porosity in a range of 10-20%.

20. The coating as recited in claim 15, wherein the coating has a porosity in a range of 5-20%.

21. The coating as recited in claim 15, wherein the coating has a porosity in a range of 5-10%.

22. The coating as recited in claim 15, wherein the coating has an yttrium to aluminum ratio of 4:1 to 1:4 by molar number.