

CLAIMS

What is claimed is:

1. A method for coating a component of a plasma processing chamber, wherein the method comprises:
 - 5 providing a component body; and
 - 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.
2. The method, as recited in claim 1, further comprising annealing the coating at
10 a temperature of at least about 900° C to form the coating into one or more of YAG, YAM or YAP.
3. The method, as recited in claim 2, wherein the component body is made of a ceramic material.
4. The method, as recited in claim 2, wherein the aluminum-containing powder
15 comprises aluminum powder or aluminum oxide powder.
5. The method, as recited in claim 2, 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
20 porous ternary oxide.
7. The component as recited in claim 6, wherein the porous ternary oxide is formed from a powder mixture of an yttria powder and an aluminum-containing powder.
8. The component as recited in claim 7, wherein the ternary oxide is one or more
25 of YAG, YAM, and YAP.
9. The component as recited in claim 7, wherein the component body is formed of a ceramic material.
10. The component as recited in claim 7, wherein the component body is formed of a silicon material.
- 30 11. The component as recited in claim 7, wherein the aluminum-containing powder comprises aluminum powder or aluminum oxide powder.
12. The component as recited in claim 7, wherein the component body forms a

dielectric window.

13. The component as recited in claim 6, wherein the coating has a porosity in a range of about 1-20%.
14. The component as recited in claim 6, wherein the coating has a porosity in a
5 range of about 10-20%.
15. The component as recited in claim 6, wherein the coating has a porosity in a range of about 5-20%.
16. The component as recited in claim 6, wherein the coating has a porosity in a range of about 5-10%.
- 10 17. 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.
18. A coating on a surface of the component body of a plasma processing chamber, comprising a deposited coating formed from a powder mixture of an yttrium oxide powder and an aluminum-containing powder.
- 15 19. The coating as recited in claim 18, wherein the coating is a porous ternary oxide, wherein the porous ternary oxide comprises one of YAG, YAM, and YAP.
20. The coating as recited in claim 18, wherein the aluminum-containing powder comprises aluminum powder or aluminum oxide powder.
21. The coating as recited in claim 18, wherein the coating has a porosity in a
20 range of about 1-20%.
22. The coating as recited in claim 18, wherein the coating has a porosity in a range of about 10-20%.
23. The coating as recited in claim 18, wherein the coating has a porosity in a range of about 5-20%.
- 25 24. The coating as recited in claim 18, wherein the coating has a porosity in a range of about 5-10%.
25. The coating as recited in claim 18, wherein the coating has an yttrium to aluminum ratio of 4:1 to 1:4 by molar number.