CLAIMS

~~1. An article comprising a ceramic coating formed thereon that is resistant to erosion by halogen-containing plasmas, wherein the ceramic coating comprises:~~

~~yttrium oxide at a concentration ranging from 80 mole % to 55 mole %; and~~

~~zirconium oxide at a concentration ranging from 20 mole % to 45 mole %.~~

~~2. The article of claim 1, wherein the ceramic coating consists essentially of:~~

~~yttrium oxide at a concentration ranging from 80 mole % to 55 mole %; and~~

~~zirconium oxide at a concentration ranging from 20 mole % to 45 mole %.~~

~~3. The article of claim 1, wherein the ceramic coating comprises:~~

~~yttrium oxide at a concentration ranging from 60 mole % to 70 mole %; and~~

~~zirconium oxide at a concentration ranging from 30 mole % to 40 mole %.~~

~~4. The article of claim 1, wherein the ceramic coating comprises:~~

~~yttrium oxide at a concentration ranging from 73.2 mole % to 35 mole %; and~~

~~zirconium oxide at a concentration ranging from 26.8 mole % to 65 mole %.~~

~~5. The article of claim 1, wherein the ceramic coating consists essentially of:~~

~~yttrium oxide at a concentration ranging from 73.2 mole % to 35 mole %; and~~

~~zirconium oxide at a concentration ranging from 26.8 mole % to 65 mole %.~~

~~6. The article of claim 1, wherein the ceramic coating comprises:~~

~~yttrium oxide at a concentration ranging from 72.1 mole % to 65.9 mole %; and~~

~~zirconium oxide at a concentration ranging from 27.9 mole % to 34.1 mole %.~~

~~7. The article of claim 1, wherein the yttrium oxide and the zirconium oxide of the ceramic coating are in a form of a solid solution.~~

~~8. The article of claim 1, wherein the ceramic coating is a sintered ceramic.~~

~~9. The article of claim 1, wherein a flexural strength of the ceramic coating ranges from 120 MPa to 140 MPa.~~

10. The article of claim 1, wherein a fracture toughness of the ceramic coating ranges from 1.1 $MPa \cdot m^{1/2}$ to 1.3 $MPa \cdot m^{1/2}$.

11. The article of claim 1, wherein a mean grain size of the ceramic coating ranges from about 2 μm to about 8 μm.

12. The article of claim 1, wherein a plasma erosion rate of the ceramic coating during exposure to a halogen-comprising plasma is less than 0.2 μm/hr.

13. The article of claim 1, wherein the article is a component of a semiconductor processing apparatus.

14. The article of claim 13, wherein the component is selected from a group consisting of a lid, a lid liner, a nozzle, a gas distribution plate, a shower head, an electrostatic chuck component, a shadow frame, a substrate holding frame, a processing kit, and a chamber liner.

15. A powder for forming a ceramic coating or a ceramic article that is resistant to erosion by halogen-containing plasmas, wherein the powder consists essentially of:

yttrium oxide at a concentration ranging from 80 mole % to 55 mole %; and

zirconium oxide at a concentration ranging from 20 mole % to 45 mole %.

16. The powder of claim 15, wherein the powder consists essentially of:

yttrium oxide at a concentration ranging from 60 mole % to 70 mole %; and

zirconium oxide at a concentration ranging from 30 mole % to 40 mole %.

17. The powder of claim 15, wherein the powder consists essentially of:

yttrium oxide at a concentration ranging from 73.2 mole % to 35 mole %; and

zirconium oxide at a concentration ranging from 26.8 mole % to 65 mole %.

18. The powder of claim 15, wherein the powder consists essentially of:

yttrium oxide at a concentration ranging from 72.1 mole % to 65.9 mole %; and

zirconium oxide at a concentration ranging from 27.9 mole % to 34.1 mole %.

19. A method for forming a ceramic coating on an article, the method comprising:

forming a green body from the powder of claim 15 on a surface of the article; and

sintering the green body to form the ceramic coating.

~~20. The method of claim 19, wherein the ceramic coating is a solid solution of the yttrium oxide and the zirconium oxide.~~

1. A coated article that is resistant to erosion by halogen-containing plasmas, the coated article comprising an article and a ceramic coating formed on the article, wherein the ceramic coating comprises:

yttrium oxide at a concentration from 65.9 mole % to 80 mole %; and

zirconium oxide at a concentration from 34.1 mole % to 20 mole %.

2. The coated article of claim 1, wherein the ceramic coating consists essentially of:

the yttrium oxide at a concentration from 65.9 mole % to 80 mole %; and

the zirconium oxide at a concentration from 34.1 mole % to 20 mole %.

3. The coated article of claim 1, wherein the ceramic coating consists of:

the yttrium oxide at a concentration from 65.9 mole % to 80 mole %; and

the zirconium oxide at a concentration from 34.1 mole % to 20 mole %.

4. The coated article of claim 1, wherein the ceramic coating comprises:

the yttrium oxide at a concentration from 65.9 mole % to 73.2 mole %; and

the zirconium oxide at a concentration from 34.1 mole % to 26.8 mole %.

5. The coated article of claim 1, wherein the ceramic coating consists essentially of:

yttrium oxide at a concentration from 65.9 mole % to 73.2 mole %; and

zirconium oxide at a concentration from 34.1 mole % to 26.8 mole %.

6. The coated article of claim 1, wherein the ceramic coating consists of:

the yttrium oxide at a concentration from 65.9 mole % to 73.2 mole %; and

the zirconium oxide at a concentration from 34.1 mole % to 26.8 mole %.

7. The coated article of claim 1, wherein the ceramic coating comprises a solid solution of the yttrium oxide and the zirconium oxide.

8. The coated article of claim 1, wherein the article is a semiconductor processing chamber component selected from a group consisting of a lid, a lid liner, a nozzle, a gas distribution plate, a shower head, an electrostatic chuck component, a shadow frame, a substrate holding frame, a processing kit, and a chamber liner.

9. The coated article of claim 1, wherein the ceramic coating is formed on the article using a technique selected from a group consisting of thermal spraying, plasma spraying, sputtering, and chemical vapor deposition.

10. A semiconductor processing apparatus adapted to have at least one surface exposed to a halogen-comprising plasma during a process performed in a semiconductor processing chamber, the semiconductor processing apparatus comprising the coated article of claim 1.