

CLAIMS

1. A method of forming a component of a plasma processing chamber, the
5 method comprising:
 providing at least one single crystal metal oxide ingot, wherein the at least one
single crystal metal oxide is single crystal spinel;
 machining the at least one single crystal metal oxide ingot to form the
component; and
10 performing a surface treatment on the component after machining.
2. The method of Claim 1, further comprising annealing the at least one single
crystal metal oxide ingot before machining.
- 15 3. The method of Claim 1, wherein machining comprises drilling a hole in the
component.
4. The method of Claim 1, wherein machining comprises slicing the at least one
single crystal metal oxide ingot.
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5. The method of Claim 3, wherein the component is a gas injector.
6. The method of Claim 1, further comprising bonding a second single crystal
metal oxide ingot to the at least one single crystal metal oxide ingot before machining.
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7. A component of a plasma processing chamber formed by the method of Claim
1.
8. A component of a plasma processing chamber, wherein at least one plasma
30 facing surface of the component comprises single crystal metal oxide material,
wherein the single crystal metal oxide material is single crystal spinel.

9. The component of Claim 8, wherein the at least one plasma facing surface comprises a layer of the single crystal metal oxide material bonded to a body of the component.
- 5 10. The component of Claim 8, wherein the component is a gas injector, wherein the nose of the gas injector comprises the single crystal metal oxide material, wherein the nose is a portion of the gas injector that is exposed to plasma in the plasma processing chamber.
- 10 11. A component of a plasma processing chamber, wherein at least one plasma facing surface of the component comprises single crystal metal oxide material, wherein the component is a gas injector, wherein the nose of the gas injector comprises the single crystal metal oxide material, wherein the nose is a portion of the gas injector that is exposed to plasma in the plasma processing chamber, and wherein
15 the nose is diffusion bonded to a body of the component, wherein the body is formed of a material that is different from the single crystal metal oxide material.
12. The component of Claim 11, wherein the body is formed of a polycrystalline material.
- 20 13. A gas injector of a plasma processing chamber, comprising:
a body; and
at least one plasma facing surface comprising a single crystal metal oxide material, wherein the single crystal metal oxide material is single crystal spinel.
- 25 14. The gas injector of Claim 13, wherein the single crystal metal oxide material is single crystal YAG.
- 30 15. The gas injector of Claim 13, further comprising a central passage through the body and a plurality of smaller passages through the body, wherein the plurality of smaller passages surround the central passage and wherein each of the plurality of smaller passages feeds into a side gas injector hole and each of the plurality of smaller

passages has a portion that is oriented at an angle within the gas injector to feed into the side gas injector hole.