

CLAIMS

- 5 1. A component of a semiconductor processing chamber, the component formed of a material comprising silicon and the component comprising a textured outer surface comprising a plurality of substantially uniform hillock-shaped structures, wherein the material is one of single crystal silicon, doped silicon, polysilicon, and multi-crystalline silicon.
- 10 2. The component as recited in Claim 1, wherein the component is at least one of an electrode, edge ring, and a liner.
3. The component as recited in Claim 1, wherein an average height of the plurality of hillock-shaped structures is in a range of about 500 nanometers to
15 20 microns.
4. The component as recited in Claim 1, wherein the textured outer surface has a surface roughness in a range of about 0.2-2 microns.
- 20 5. The component as recited in Claim 1, wherein an average reflectance of the plurality of hillock-shaped structures is in a range of about 5-30% between 400-800 nm of light.
6. The component as recited in Claim 1, wherein the plurality of hillock-shaped
25 structures are inverted hillock-shaped structures.
7. A component adapted for use in a semiconductor processing chamber, comprising a multi-crystalline silicon body including a textured surface having a surface area, wherein the textured surface comprises an area having a
30 plurality of bumps or pits, wherein the textured surface comprises a plurality of grain surfaces including a first grain surface and a second grain surface,

wherein the first grain surface has a texture that is different from that of the second grain surface.

- 5 8. The component as recited in claim 7, wherein the multi-crystalline silicon body is a cast multi-crystalline silicon body.
9. The component as recited in claim 7, wherein the multi-crystalline silicon body is a bulk multi-crystalline silicon body.
- 10 10. The component as recited in Claim 7, wherein the component is at least one of an electrode, edge ring, and a liner.
11. The component as recited in Claim 7, wherein an average height of the plurality of bumps or pits is in a range of about 500 nanometers to 20 microns.
- 15 12. The component as recited in Claim 7, wherein the area having the plurality of bumps or pits is formed over at least 90% of an entire surface area of the textured surface.
- 20 13. A method for texturing a silicon component of a semiconductor processing chamber, the method comprising:
 - providing the silicon component having an outer surface; and
 - texturing the outer surface to create a plurality of substantially uniform hillock-shaped structures on the outer surface, wherein the silicon component
- 25 is formed of one of single crystal silicon, doped silicon, polysilicon, and multi-crystalline silicon.
14. The method as recited in Claim 13, wherein the silicon component is selectively textured.
- 30 15. The method as recited in Claim 13, wherein texturing is achieved by chemically etching the outer surface.

16. The method as recited in claim 15, wherein chemically etching is performed using a solution comprising potassium hydroxide.
- 5 17. The method as recited in Claim 15, wherein chemically etching is performed using a solution comprising sodium hydroxide.
18. The method as recited in Claim 15, wherein chemically etching is performed using an acid mixture comprising nitric acid, acetic acid and hydrofluoric acid.
- 10 19. The method as recited in Claim 18, wherein the acid mixture comprises nitric acid, hydrofluoric acid and acetic acid at a molar ratio of 4:1:6.
20. The method as recited in Claim 13, wherein the plurality of hillock-shaped structures have a first average height in a range of about 500 nanometers to 20 microns.
- 15 21. The method as recited in Claim 20, further comprising refurbishing the outer surface after the plurality of hillock-shaped structures have eroded and have a second average height, wherein refurbishing comprises re-etching the outer surface to regenerate one or more of the plurality of hillock-shaped structures to have a third average height, wherein the second average height is less than the first average height and the third average height.
- 20 22. The method as recited in Claim 13, further comprising forming an oxide layer on the outer surface after texturing the outer surface.
- 25 23. The method as recited in Claim 13, wherein texturing is achieved by patterning using soft or hard masks followed by etching the outer surface.
- 30 24. The method as recited in Claim 13, wherein texturing creates a textured surface that can be used as a mask to generate further texturing.

25. The method as recited in Claim 13, wherein the plurality of hillock-shaped structures are inverted hillock-shaped structures.
- 5 26. The method as recited in Claim 25, wherein texturing is achieved by chemically etching the outer surface, wherein chemically etching is performed using a solution comprising $\text{Cu}(\text{NO}_3)_2/\text{HF}/\text{H}_2\text{O}_2/\text{H}_2\text{O}$.
- 10 27. A method for manufacturing a multi-crystalline silicon component for use in a semiconductor processing chamber, the method comprising:
 providing a multi-crystalline silicon body having a surface; and
 texturing the surface of the multi-crystalline silicon body to form a textured surface having a surface area, wherein the textured surface comprises an area having a plurality of bumps or pits, wherein the plurality of bumps or
15 pits have a height of at least 500 nm.
28. The method, as recited in claim 27, wherein texturing comprises anisotropically etching the surface.
- 20 29. The method, as recited in claim 27, wherein anisotropically etching the surface comprises exposing the surface to a mixed acid.
30. The method, as recited in claim 27, wherein providing the multi-crystalline silicon body comprises casting the multi-crystalline silicon body.
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31. The method, as recited in claim 27, wherein providing the multi-crystalline silicon body comprises polishing a used multi-crystalline silicon body.
- 30 32. The method, as recited in claim 27, wherein texturing comprises exposing the surface to a mixture of nitric acid, hydrofluoric acid, and acetic acid.

33. The method, as recited in claim 31, wherein the hydrofluoric acid has a molarity, and the acetic acid has a molarity, and wherein the molarity of the acetic acid is at least twice the molarity of the hydrofluoric acid.
- 5 34. The method, as recited in claim 32, wherein the nitric acid has a molarity, and the acetic acid has a molarity, and wherein the molarity of the acetic acid is greater than the molarity of the nitric acid.
- 10 35. The method, as recited in claim 27, wherein the area having the plurality of bumps or pits is formed over at least 90% of an entire area of the surface area.