CLAIMS

What is claimed is:

1. An electrostatic chuck, comprising:

a conductive path covering at least a portion of a workpiece-contacting surface of a gas seal ring of the electrostatic chuck, the conductive path comprising at least a portion of an electrical path to ground; and

a main field area of a workpiece-contacting surface of the electrostatic chuck comprising a surface resistivity in the range of from about 10^8 to about 10^{12} ohms per square.

2. An electrostatic chuck according to Claim 1, wherein the conductive path comprises a surface resistivity of less than about 10^7 ohms per square.

3. An electrostatic chuck according to Claim 2, wherein the conductive path comprises a surface resistivity in the range of from about 10^5 ohms per square to about 10^7 ohms per square.

4. An electrostatic chuck according to Claim 1, wherein the conductive path comprises diamond-like carbon.

5. An electrostatic chuck according to Claim 4, wherein the conductive path comprises doped diamond-like carbon.

6. An electrostatic chuck according to Claim 5, wherein the conductive path comprises hydrogenated carbon doped with nitrogen.

7. An electrostatic chuck according to Claim 1, wherein the conductive path comprises a coating of a thickness less than about 1 micron.

8. An electrostatic chuck according to Claim 1, wherein the conductive path comprises a coating covering at least a portion of an outside edge of the electrostatic chuck.

9. An electrostatic chuck according to Claim 8, wherein the conductive path wraps underneath an insulator layer of the electrostatic chuck.

10. An electrostatic chuck according to Claim 1, wherein the main field area comprises silicon carbide.

11. An electrostatic chuck according to Claim 10, wherein the main field area comprises a surface resistivity in the range of from about 10^9 to about 10^{11} ohms per square.

12. An electrostatic chuck according to Claim 1, wherein the electrostatic chuck comprises a conductive grounding layer, at least a portion of which is underneath an insulator layer of the electrostatic chuck, the conductive grounding layer electrically contacting the conductive path.

13. An electrostatic chuck according to Claim 12, wherein at least a portion of the outside edge of the conductive grounding layer is covered by the conductive path.

14. An electrostatic chuck according to Claim 12, wherein the conductive grounding layer electrically contacts a grounding pin of the electrostatic chuck.

15. An electrostatic chuck according to Claim 12, further comprising an electrically conductive epoxy layer underlying at least a portion of the conductive grounding layer.

16. An electrostatic chuck according to Claim 1, wherein the main field area comprises at least one embossment extending above surrounding portions of the main field area.

17. An electrostatic chuck according to Claim 16, further comprising a conductive coating on a workpiece-contacting surface of the at least one embossment.

18. An electrostatic chuck according to Claim 17, wherein the conductive path of the electrostatic chuck and the conductive coating on the workpiece-contacting surface of the at least one embossment each comprise a diamond like carbon coating.

19. An electrostatic chuck according to Claim 17, wherein the electrostatic chuck comprises a conductive grounding layer, at least a portion of which is underneath an insulator layer of the electrostatic chuck, the conductive grounding layer electrically contacting the conductive path.

20. An electrostatic chuck according to Claim 17, wherein a base of the electrostatic chuck comprises a chamfered area on one or more edges of the base.

21. An electrostatic chuck according to Claim 20, wherein the conductive path electrically contacts the base through a conductive epoxy in the chamfered area.

22. An electrostatic chuck according to Claim 21, wherein the conductive path comprises a coating covering at least a portion of an outside edge of the electrostatic chuck, the conductive path wrapping underneath an insulator layer of the electrostatic chuck.

23. An electrostatic chuck according to Claim 1, further comprising at least one conductive pattern on the workpiece-contacting surface of the electrostatic chuck, the at least one conductive pattern electrically contacting the conductive path.

24. An electrostatic chuck according to Claim 23, wherein the at least one conductive pattern comprises a metal coated with a conductive coating.

25. An electrostatic chuck according to Claim 23, wherein the at least one conductive pattern comprises at least one of: a spoke extending towards the center of the electrostatic chuck; a ring around a gas hole of the electrostatic chuck; and a trace between at least one embossment on the workpiece-contacting surface of the electrostatic chuck.

26. An electrostatic chuck according to Claim 1, wherein the main field area of the electrostatic chuck comprises a polymer.

27. An electrostatic chuck according to Claim 26, wherein the main field area comprises at least one embossment extending above surrounding portions of the main field area, the at least one embossment comprising a polymer.

28. An electrostatic chuck according to Claim 26, wherein the main field area comprises a surface resistivity in the range of from about 10^8 to about 10^{10} ohms per square.

29. An electrostatic chuck according to Claim 26, wherein the conductive path comprises a conductive coating, the conductive coating also covering at least a portion of the main field area.

30. An electrostatic chuck, comprising:

a conductive path electrically connected to at least a portion of a workpiece-contacting surface of the electrostatic chuck, the conductive path comprising at least a portion of an electrical path to ground; and

a main field area of a workpiece-contacting surface of the electrostatic chuck comprising a surface resistivity in the range of from about 10^8 to about 10^{10} ohms per square, the main field area comprising a polymer comprising carbon nanotubes.

31. An electrostatic chuck according to Claim 30, wherein the polymer comprises at least one of: carbon nanotube filled polyether imide; carbon nanotube filled polyether ether ketone; and carbon nanotube filled polyimide.

CLAIMS

What is claimed is:

1. An electrostatic chuck, comprising:

a conductive path covering at least a portion of a workpiece-contacting surface of a gas seal ring of the electrostatic chuck, the conductive path comprising a coating covering at least a portion of an outside edge of the electrostatic chuck and comprising at least a portion of an electrical path to ground; and

a main field area of a workpiece-contacting surface of the electrostatic chuck comprising a surface resistivity in the range of from about 10^8 to about 10^{12} ohms per square.

2. An electrostatic chuck according to Claim 1, wherein the conductive path comprises a surface resistivity of less than about 10^7 ohms per square.

3. An electrostatic chuck according to Claim 2, wherein the conductive path comprises a surface resistivity in the range of from about 10^5 ohms per square to about 10^7 ohms per square.

4. An electrostatic chuck according to Claim 1, wherein the conductive path comprises diamond-like carbon.

5. An electrostatic chuck according to Claim 4, wherein the conductive path comprises doped diamond-like carbon.

6. An electrostatic chuck according to Claim 5, wherein the conductive path comprises hydrogenated carbon doped with nitrogen.

7. An electrostatic chuck according to Claim 1, wherein the conductive path comprises a coating of a thickness less than about 1 micron.

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8. (Canceled)

9. An electrostatic chuck according to Claim 1, wherein the conductive path wraps underneath an insulator layer of the electrostatic chuck.

10. An electrostatic chuck according to Claim 1, wherein the main field area comprises silicon carbide.

11. An electrostatic chuck according to Claim 10, wherein the main field area comprises a surface resistivity in the range of from about 10^9 to about 10^{11} ohms per square.

12. An electrostatic chuck according to Claim 1, wherein the electrostatic chuck comprises a conductive grounding layer, at least a portion of which is underneath an insulator layer of the electrostatic chuck, the conductive grounding layer electrically contacting the conductive path.

13. An electrostatic chuck according to Claim 12, wherein at least a portion of the outside edge of the conductive grounding layer is covered by the conductive path.

14. An electrostatic chuck according to Claim 12, wherein the conductive grounding layer electrically contacts a grounding pin of the electrostatic chuck.

15. An electrostatic chuck according to Claim 12, further comprising an electrically conductive epoxy layer underlying at least a portion of the conductive grounding layer.

16. An electrostatic chuck according to Claim 1, wherein the main field area comprises at least one embossment extending above surrounding portions of the main field area.

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17. An electrostatic chuck according to Claim 16, further comprising a conductive coating on a workpiece-contacting surface of the at least one embossment.

18. An electrostatic chuck according to Claim 17, wherein the conductive path of the electrostatic chuck and the conductive coating on the workpiece-contacting surface of the at least one embossment each comprise a diamond like carbon coating.

19. An electrostatic chuck according to Claim 17, wherein the electrostatic chuck comprises a conductive grounding layer, at least a portion of which is underneath an insulator layer of the electrostatic chuck, the conductive grounding layer electrically contacting the conductive path.

20. An electrostatic chuck according to Claim 17, wherein a base of the electrostatic chuck comprises a chamfered area on one or more edges of the base.

21. An electrostatic chuck according to Claim 20, wherein the conductive path electrically contacts the base through a conductive epoxy in the chamfered area.

22. An electrostatic chuck according to Claim 21, wherein the conductive path comprises a coating covering at least a portion of an outside edge of the electrostatic chuck, the conductive path wrapping underneath an insulator layer of the electrostatic chuck.

23. An electrostatic chuck according to Claim 1, further comprising at least one conductive pattern on the workpiece-contacting surface of the electrostatic chuck, the at least one conductive pattern electrically contacting the conductive path.

24. An electrostatic chuck according to Claim 23, wherein the at least one conductive pattern comprises a metal coated with a conductive coating.

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25. An electrostatic chuck according to Claim 23, wherein the at least one conductive pattern comprises at least one of: a spoke extending towards the center of the electrostatic chuck, a ring around a gas hole of the electrostatic chuck; and a trace between at least one embossment on the workpiece-contacting surface of the electrostatic chuck.

26. An electrostatic chuck according to Claim 1, wherein the main field area of the electrostatic chuck comprises a polymer.

27. An electrostatic chuck according to Claim 26, wherein the main field area comprises at least one embossment extending above surrounding portions of the main field area, the at least one embossment comprising a polymer.

28. An electrostatic chuck according to Claim 26, wherein the main field area comprises a surface resistivity in the range of from about 10^8 to about 10^{10} ohms per square.

29. An electrostatic chuck according to Claim 26, wherein the conductive path comprises a conductive coating, the conductive coating also covering at least a portion of the main field area.

30. An electrostatic chuck, comprising:

a conductive path electrically connected to at least a portion of a workpiece-contacting surface of the electrostatic chuck, the conductive path comprising at least a portion of an electrical path to ground; and

a main field area of a workpiece-contacting surface of the electrostatic chuck comprising a surface resistivity in the range of from about 10^8 to about 10^{10} ohms per square, the main field area comprising a polymer comprising carbon nanotubes.

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31. An electrostatic chuck according to Claim 30, wherein the polymer comprises at least one of: carbon nanotube filled polyether imide; carbon nanotube filled polyether ether ketone; and carbon nanotube filled polyimide.

AMENDED SHEET(ART. 34)

CLAIMS

What is claimed is:

1. An electrostatic chuck, comprising:

a conductive path covering at least a portion of a workpiece-contacting surface of a gas seal ring of the electrostatic chuck, the conductive path comprising a coating covering at least a portion of an outside edge of the electrostatic chuck and comprising at least a portion of an electrical path to ground, the conductive path comprising a surface resistivity in the range of from 10^5 ohms per square to 10^7 ohms per square; and

a main field area of a workpiece-contacting surface of the electrostatic chuck comprising a surface resistivity in the range of from 10^8 to 10^{12} ohms per square, the main field area comprising at least one embossment extending above surrounding portions of the main field area; and

a conductive coating on a workpiece-contacting surface of the at least one embossment.

2. An electrostatic chuck according to Claim 1, wherein the conductive path comprises diamond-like carbon.

3. An electrostatic chuck according to Claim 2, wherein the conductive path comprises doped diamond-like carbon.

4. An electrostatic chuck according to Claim 3, wherein the conductive path comprises hydrogenated carbon doped with nitrogen.

5. An electrostatic chuck according to Claim 1, wherein the conductive path comprises a coating of a thickness less than 1 micron.

6. An electrostatic chuck according to Claim 1, wherein the conductive path wraps underneath an insulator layer of the electrostatic chuck.

7. An electrostatic chuck according to Claim 1, wherein the main field area comprises silicon carbide.

8. An electrostatic chuck according to Claim 7, wherein the main field area comprises a surface resistivity in the range of from 10^9 to 10^{11} ohms per square.

9. An electrostatic chuck according to Claim 1, wherein the electrostatic chuck comprises a conductive grounding layer, at least a portion of which is underneath an insulator layer of the electrostatic chuck, the conductive grounding layer electrically contacting the conductive path.

10. An electrostatic chuck according to Claim 9, wherein at least a portion of the outside edge of the conductive grounding layer is covered by the conductive path.

11. An electrostatic chuck according to Claim 9, wherein the conductive grounding layer electrically contacts a grounding pin of the electrostatic chuck.

12. An electrostatic chuck according to Claim 9, further comprising an electrically conductive epoxy layer underlying at least a portion of the conductive grounding layer.

13. An electrostatic chuck according to Claim 1, wherein the conductive path of the electrostatic chuck and the conductive coating on the workpiece-contacting surface of the at least one embossment each comprise a diamond like carbon coating.

14. An electrostatic chuck according to Claim 1, wherein the electrostatic chuck comprises a conductive grounding layer, at least a portion of which is underneath an insulator layer of the electrostatic chuck, the conductive grounding layer electrically contacting the conductive path.

15. An electrostatic chuck according to Claim 1, wherein a base of the electrostatic chuck comprises a chamfered area on one or more edges of the base.

16. An electrostatic chuck according to Claim 15, wherein the conductive path electrically contacts the base through a conductive epoxy in the chamfered area.

17. An electrostatic chuck according to Claim 16, wherein the conductive path comprises a coating covering at least a portion of an outside edge of the electrostatic chuck, the conductive path wrapping underneath an insulator layer of the electrostatic chuck.

18. An electrostatic chuck according to Claim 1, further comprising at least one conductive pattern on the workpiece-contacting surface of the electrostatic chuck, the at least one conductive pattern electrically contacting the conductive path.

19. An electrostatic chuck according to Claim 18, wherein the at least one conductive pattern comprises a metal coated with a conductive coating.

20. An electrostatic chuck according to Claim 18, wherein the at least one conductive pattern comprises at least one of: a spoke extending towards the center of the electrostatic chuck; a ring around a gas hole of the electrostatic chuck; and a trace between at least one embossment on the workpiece-contacting surface of the electrostatic chuck.

21. An electrostatic chuck according to Claim 1, wherein the main field area of the electrostatic chuck comprises a polymer.

22. An electrostatic chuck according to Claim 21, wherein the main field area comprises at least one embossment extending above surrounding portions of the main field area, the at least one embossment comprising a polymer.

23. An electrostatic chuck according to Claim 21, wherein the main field area comprises a surface resistivity in the range of from 10^8 to 10^{10} ohms per square.

24. An electrostatic chuck according to Claim 21, wherein the conductive path comprises a conductive coating, the conductive coating also covering at least a portion of the main field area.

25. An electrostatic chuck according to Claim 1, the main field area comprising a polymer comprising carbon nanotubes.

26. An electrostatic chuck according to Claim 25, wherein the polymer comprises at least one of: carbon nanotube filled polyether imide; carbon nanotube filled polyether ether ketone; and carbon nanotube filled polyimide.