Claims

1. An electrical discharge ozone generation cell comprising:

a nonconductive spacer plate separating first and second electrode base plates, the spacer plate having two sides and interior edges defining a central opening in the spacer plate;

an electrode plate in intimate contact with the first electrode base plate, the electrode plate fitted within the central opening of the spacer plate;

a dielectric plate in intimate contact with the second electrode base plate and with the spacer plate, a gas discharge chamber defined by the dielectric plate, the interior edges of the spacer plate and the electrode plate; and

gaskets on the two sides of the spacer plate around the central opening displaced away from the interior edges of the spacer plate whereby the gaskets ensure a gas seal for the gas discharge chamber at a reduced exposure to ozone in the gas discharge chamber.

2. The electrical discharge ozone generation cell of claim 1 wherein the gaskets comprise O-ring gaskets.

3. The electrical discharge ozone generation cell of claim 2 further comprising:

grooves in both sides of the spacer plate around the central opening displaced away from the interior edges of the spacer plate to receive the O-ring gaskets.

4. The electrical discharge ozone generation cell of claim 1 wherein the gaskets comprises elastic material.

5. The electrical discharge ozone generation cell of claim 4 wherein the gaskets comprises FKM (fluoroelastomer) material.

6. The electrical discharge ozone generation cell of claim 1 wherein the spacer plate comprises polycarbonate.

7. The electrical discharge ozone generation cell of claim 1 wherein the electrode plate comprises anodized aluminum infused with PTFE (Polytetrafluoroethylene).

8. The electrical discharge ozone generation cell of claim 1 wherein the electrode plate comprises anodized aluminum.

9. The electrical discharge ozone generation cell of claim 1 wherein the electrode plate comprises high chrome steel.

10. The electrical discharge ozone generation cell of claim 1 wherein the electrode plate comprises anodized alumina bonded to a conductive carrier.

11. The electrical discharge ozone generation cell of claim 1 wherein the first and second electrode base plates comprise aluminum.

12. The electrical discharge ozone generation cell of claim 1 wherein the spacer plate has a first predetermined thickness, the electrode plate has a second predetermined thickness, the dielectric plate has a third predetermined thickness and a difference between the first predetermined thickness and a sum of the second and third predetermined thicknesses creates the gas discharge chamber with the interior edges of the spacer plate.

13. An electrical discharge ozone generation cell comprising:

a nonconductive spacer plate separating first and second electrode base plates, the spacer plate having two sides and interior edges defining a central opening in the spacer plate;

an electrode plate in intimate contact with the first electrode base plate, the electrode plate fitted within the central opening of the spacer plate;

a dielectric plate in intimate contact with the second electrode base plate and with the spacer plate, a gas discharge chamber defined by the dielectric plate, the interior edges of the spacer plate and the electrode plate; and

gaskets on the two sides of the spacer plate around the central opening to ensure a gas seal for the gas discharge chamber;

wherein the spacer plate has a first predetermined thickness, the electrode plate has a second predetermined thickness, the dielectric plate has a third predetermined thickness, and a difference between the first predetermined thickness and a sum of the second and third predetermined thicknesses creates the gas discharge chamber with the interior edges of the spacer plate.

14. The electrical discharge ozone generation cell of claim 13, wherein the difference between the first predetermined thickness and the sum of the second and third predetermined thicknesses is in a range of (10 to 30) x 10^{-3} inches.

15. The electrical discharge ozone generation cell of claim 13 wherein the spacer plate comprises polycarbonate.

16. The electrical discharge ozone generation cell of claim 13 wherein the electrode plate comprises anodized aluminum infused with PTFE (Polytetrafluoroethylene).

17. The electrical discharge ozone generation cell of claim 13 wherein the first and second electrode base plates comprise aluminum.

18. The electrical discharge ozone generation cell of claim 13 wherein the gaskets comprises elastic material.

19. The electrical discharge ozone generation cell of claim 18 wherein the gaskets comprises FKM (fluoroelastomer) material.

20. An electrical discharge ozone generation cell comprising

a nonconductive spacer plate separating first and second electrode base plates, the spacer plate having two sides and interior edges defining a central opening in the spacer plate;

an electrode plate in intimate contact with the first electrode base plate, the electrode plate fitted within the central opening of the spacer plate, wherein the electrode plate comprises anodized aluminum infused with PTFE (Polytetrafluoroethylene);

a dielectric plate in intimate contact with the second electrode base plate and with the spacer plate, a gas discharge chamber defined by the dielectric plate, the interior edges of the spacer plate and the electrode plate; and

gaskets on the two sides of the spacer plate around the central opening displaced away from the interior edges of the spacer plate whereby the gaskets ensure a gas seal for the gas discharge chamber at a reduced exposure to ozone in the gas discharge chamber.

21. The electrical discharge ozone generation cell of claim 20 wherein the spacer plate comprises polycarbonate.

22. The electrical discharge ozone generation cell of claim 20 wherein the first and second electrode base plates comprise aluminum.

23. The electrical discharge ozone generation cell of claim 20 wherein the gaskets comprises elastic material.

24. The electrical discharge ozone generation cell of claim 23 wherein the gaskets comprises FKM (fluoroelastomer) material.

25. An electrical discharge ozone generation cell comprising

a nonconductive flat spacer plate separating first and second electrode base plates, the spacer plate having two sides and interior edges defining a central opening in the spacer plate;

a flat electrode plate in intimate contact with the first electrode base plate, the electrode plate fitted within the central opening of the spacer plate;

a flat dielectric plate in intimate contact with the second electrode base plate and with the spacer plate, a gas discharge chamber defined by the dielectric plate, the interior edges of the spacer plate and the electrode plate;

gaskets on the two sides of the spacer plate around the central opening displaced away from the interior edges of the spacer plate whereby the gaskets ensure a gas seal for the gas discharge chamber at a reduced exposure to ozone in the gas discharge chamber; and

a clamping arrangement engaging peripheries of the first and second electrode base plates through the spacer plate;

whereby the flat spacer plate, flat electrode plate, flat dielectric plate and gaskets are bound together between the first and second electrode base plates with minimal distortion.

26. The electrical discharge ozone generation cell of claim 25 wherein the clamping arrangement comprises a plurality of holes distributed around the peripheries of the first and second electrode base plates and the spacer plate, and a corresponding plurality of nonconductive fasteners, each fastener binding the first and second electrode base plates with the flat spacer plate between them through a corresponding hole.

27. The electrical discharge ozone generation cell of claim 26 wherein each fastener comprises a threaded rod and a reciprocally threaded nut.

28. The electrical discharge ozone generation cell of claim 27 wherein the threaded rod comprises a bolt.

29. The electrical discharge ozone generation cell of claim 26 wherein each fastener comprises plastic reinforced with fiberglass.

30. The electrical discharge ozone generation cell of claim 25 wherein each of the plurality of holes distributed around the peripheries of the first and second electrode base plates is chamfered.

31. The electrical discharge ozone generation cell of claim 30 wherein the first and second electrode base plates each have a flat surface facing the spacer plate, each of the plurality of holes distributed around the peripheries of the first and second electrode base plates chamfered in the flat surface.

32. The electrical discharge ozone generation cell of claim 25 wherein the spacer plate laterally extends beyond the first and second electrode base plates.

33. The electrical discharge ozone generation cell of claim 25 wherein the flat spacer plate includes a recess in one side around the periphery of the central opening to hold the dielectric plate.

34. The electrical discharge ozone generation cell of claim 33 wherein the recess includes one of the gaskets around the central opening displaced away from the interior edges of the spacer plate.

35. An electrical discharge ozone generation cell comprising

a nonconductive spacer plate separating first and second electrode base plates, the spacer plate having two sides and interior edges defining a central opening in the spacer plate;

an electrode plate in intimate contact with a surface of the first electrode base plate, the electrode plate fitted within the central opening of the spacer plate;

a dielectric plate in intimate contact with the second electrode base plate and with the spacer plate, a gas discharge chamber defined by the dielectric plate, the interior edges of the spacer plate and the electrode plate, the gas discharge chamber having two opposing ends at which a displacement of the interior edges of the central opening from the electrode plate at the two opposing ends; and

channels along the surface of the first electrode base plate at each of the two opposing ends of the gas discharge chamber, the channels connected through the first electrode base plate to gas input and output terminals, the channels exposed to the gas discharge chamber by a displacement of the interior edges of the central opening from the electrode plate at the two opposing ends;

whereby the channels form manifolds for the input and output of gas to and from the gas discharge chamber.

36. The electrical discharge ozone generation cell of claim 35 wherein the spacer plate has a first predetermined thickness, the electrode plate has a second predetermined thickness, the dielectric plate has a third predetermined thickness, and a difference between the first predetermined thickness and a sum of the second and third predetermined thicknesses creates the gas discharge chamber with the interior edges of the spacer plate.

37. The electrical discharge ozone generation cell of claim 35, further comprising:

gaskets on the two sides of the spacer plate around the central opening displaced away from the interior edges of the spacer plate whereby the gaskets ensure a gas seal for the gas discharge chamber at a reduced exposure to ozone in the gas discharge chamber.

38. The electrical discharge ozone generation cell of claim 37 wherein the gaskets comprises elastic material.

39. The electrical discharge ozone generation cell of claim 38 wherein the gaskets comprises FKM (fluoroelastomer) material.

40. The electrical discharge ozone generation cell of claim 35 wherein the spacer plate comprises polycarbonate.

41. The electrical discharge ozone generation cell of claim 35 wherein the electrode plate comprises anodized aluminum infused with PTFE (Polytetrafluoroethylene).

42. The electrical discharge ozone generation cell of claim 35 wherein the first and second electrode base plates comprise aluminum.