CLAIMS

1. A liquid medium plasma discharge apparatus comprising:

a main body filled with a liquid medium;

a power electrode provided at one side within the main body to receive electric power for generating an electric field; and

a dielectric diaphragm member provided in the main body, wherein the dielectric diaphragm member has an dielectric constant and is composed of a dielectric having at least one hole or slit,

wherein the strength of the electric field generated increases as the dielectric constant of the diaphragm member decreases.

2. The liquid medium plasma discharge apparatus according to claim 1, wherein the diaphragm member is disposed in contact with the power electrode.

3. The liquid medium plasma discharge apparatus according to claim 1, wherein the diaphragm member is disposed at a distance from the power electrode.

4. The liquid medium plasma discharge apparatus according to any one of claims 1 to 3, wherein the dielectric constant of the diaphragm member is smaller than that of the liquid medium.

5. The liquid medium plasma discharge apparatus according to any one of claims 1 to 3, further comprising a ground electrode provided in the main body opposite the power electrode with the diaphragm member interposed therebetween, wherein the diaphragm member is disposed in contact with the ground electrode.

6. The liquid medium plasma discharge apparatus according to claim 5, wherein the dielectric constant of the diaphragm member is smaller than that of the liquid medium.

CLAIMS

1. A liquid medium plasma discharge apparatus, comprising:

a main body filled with a liquid medium;

a power electrode provided at one side in the main body to receive electric power; and

a dielectric diaphragm member provided in the main body,

wherein the dielectric diaphragm member includes a dielectric and has at least one hole or slit configured to generate a plasma discharge channel therein.

2. The liquid medium plasma discharge apparatus according to claim 1, wherein the dielectric diaphragm member is disposed in contact with the power electrode.

3. The liquid medium plasma discharge apparatus according to claim 1, wherein the dielectric diaphragm member is disposed at a distance from the power electrode.

4. The liquid medium plasma discharge apparatus according to claim 1, wherein a dielectric constant of the dielectric diaphragm member is smaller than a dielectric constant of the liquid medium.

5. The liquid medium plasma discharge apparatus according to claim 1, wherein a strength of an electric field generated in the hole or slit by the power electrode increases as a dielectric constant of the dielectric diaphragm member decreases.

6. A liquid medium plasma discharge apparatus, comprising:

a main body filed with a liquid medium;

a power electrode provided at one side within the main body to receive electric power;

a dielectric diaphragm member provided in the main body, the dielectric diaphragm member being composed of a dielectric having at least one hole or slit; and

a ground electrode provided in the main body opposite the power electrode with the diaphragm member interposed therebetween, wherein the diaphragm member is disposed in contact with the ground electrode.

7. The liquid medium plasma discharge apparatus according to claim 6, wherein a dielectric constant of the dielectric diaphragm member is smaller than a dielectric constant of the liquid medium.

8. The liquid medium plasma discharge apparatus according to claim 6, wherein a strength of an electric field generated in the hole or slit by the power electrode increases as a dielectric constant of the dielectric diaphragm member decreases.

9. The liquid medium plasma discharge apparatus according to claim 2, wherein a dielectric constant of the dielectric diaphragm member is smaller than a dielectric constant of the liquid medium.

10. The liquid medium plasma discharge apparatus according to claim 3, wherein a dielectric constant of the dielectric diaphragm member is smaller than a dielectric constant of the liquid medium.

11. The liquid medium plasma discharge apparatus according to claim 2, wherein a strength of an electric field generated in the hole or slit by the power electrode increases as a dielectric constant of the dielectric diaphragm member decreases.

12. The liquid medium plasma discharge apparatus according to claim 3, wherein a strength of an electric field generated in the hole or slit by the power electrode increases as a dielectric constant of the dielectric diaphragm member decreases.

13. The liquid medium plasma discharge apparatus according to claim 2, further comprising a ground electrode provided in the main body opposite the power electrode with the dielectric diaphragm member interposed therebetween, wherein the dielectric diaphragm member is disposed in contact with the ground electrode.

14. The liquid medium plasma discharge apparatus according to claim 3, further comprising a ground electrode provided in the main body opposite the power electrode with the dielectric diaphragm member interposed therebetween, wherein the dielectric diaphragm member is disposed in contact with the ground electrode.

15. The liquid medium plasma discharge apparatus according to claim 13, wherein a dielectric constant of the dielectric diaphragm member is smaller than a dielectric constant of the liquid medium.

16. The liquid medium plasma discharge apparatus according to claim 14, wherein a dielectric constant of the dielectric diaphragm member is smaller than a dielectric constant of the liquid medium.

17. The liquid medium plasma discharge apparatus according to claim 13, wherein a strength of an electric field generated in the hole or slit by the power electrode increases as a dielectric constant of the dielectric diaphragm member decreases.

18. The liquid medium plasma discharge apparatus according to claim 14, wherein a strength of an electric field generated in the hole or slit by the power electrode increases as a dielectric constant of the dielectric diaphragm member decreases.

19. The liquid medium plasma discharge apparatus according to claim 1, further comprising a power supply device configured to supply to the power electrode a voltage sufficient to cause plasma discharge in the liquid medium.

20. The liquid medium plasma discharge apparatus according to claim 1, further comprising a ground electrode provided in the main body opposite the power electrode with the dielectric member interposed therebetween, wherein the dielectric diaphragm member is disposed in contact with the ground electrode.