CLAIMS

1. An optical lens comprising:

a front lens comprising a front lens exterior surface and a front lens interior surface;

a back lens comprising a back lens interior surface and a back lens exterior surface said back lens positioned proximate to said front lens such that said front lens interior surface and said back lens interior surface form a cavity therebetween;

a volume of saline solution and oil contained within the cavity formed between said front lens interior surface and said back lens interior surface, said volume of saline solution and oil comprising a meniscus therebetween; and

a meniscus wall comprising a first portion with a first dielectric thickness and a second portion with a second dielectric thickness, wherein the first dielectric thickness is greater than the second dielectric thickness and each of the first portion and the second portion border the meniscus formed between the saline solution and oil.

2. The optical lens of claim 1 wherein at least one of the front lens and the back lens is essentially flat.

3. The optical lens of claim 1 wherein the front lens and the back lens comprise an arcuate lens.

4. The optical lens of claim 3 additionally comprising a conductive coating on at least a portion of said meniscus wall.

5. The optical lens of claim 4 wherein the volume of oil is less than the volume of saline solution contained within the cavity.

6. The optical lens of claim 5 wherein the volume of oil comprises about 66% or more by volume as compared to an amount of saline solution.

7. The optical lens of claim 5 wherein the volume of oil comprises about 90% or less by volume as compared to an amount of saline solution.

8. The optical lens of claim 4 wherein the volume of oil comprises a density about equal to a density of the saline solution.

9. The optical lens of claim 4 wherein the volume of oil comprises density within about 10% of a density of the saline solution.

10. The optical lens of claim 4 wherein the volume of oil comprises density within about 5% of a density of the saline solution.

11. The optical lens of claim 4 wherein the conductive coating extends from an area interior to the cavity to an area external to the cavity.

12. The optical lens of claim 11, wherein the area of conductive coating external to the cavity forms an electrical terminal for providing an electrical potential to the liquid meniscus lens.

13. The optical lens of claim 11 wherein the saline solution and the oil form a meniscus and an application of an electrical potential to the area of conductive coating external to the cavity causes a change in position of contact of the meniscus along the meniscus wall.

14. The optical lens of claim 11 wherein the electrical potential comprises a direct current.

15. The optical lens of claim 11 wherein the electrical potential comprises between about 5.0 volts to 60.0 volts.

16. The optical lens of claim 15 wherein the electrical potential comprises about 20.0 volts.

17. The optical lens of claim 15 wherein the electrical potential comprises about 5.0 volts.

18. The optical lens of claim 11 wherein the electrical potential comprises between about 3.5 volts to about 7.5 volts.

19. The optical lens of claim 5 wherein the front curve lens exterior surface comprises an optical power other than about 0.

20. The optical lens of claim 5 wherein the front curve lens interior surface comprises an optical power other than about 0.

21. The optical lens of claim 5 wherein the back curve lens exterior surface comprises an optical power other than about 0.

22. The optical lens of claim 5 wherein the back curve lens interior surface comprises an optical power other than about 0.

23. The optical lens of claim 5 additionally comprising a channel through one or both of the front curve lens and the back curve lens and a conductive material filling the channel.

24. The optical lens of claim 23 additionally comprising a terminal in electrical communication with the conductive material filling the channel.

25. The optical lens of claim 24 wherein application of an electrical potential to the terminal causes a change in the shape of the meniscus.

26. The optical lens of claim 5 additionally comprising an insulator coating along at least a portion of the interior surface of the front curve lens, wherein the insulator coating comprises an electrical insulator.

27. The optical lens of claim 26, wherein the insulator comprises one of Parylene C™ and Teflon AF.

28. The optical lens of claim 26 wherein the insulator comprises a boundary area to maintain separation between the conductive coating and a saline solution contained in the cavity between the front curve lens and the back curve lens.

29. The optical lens of claim 5 wherein an angle of the conical frustum comprising the meniscus wall comprises between about 30° and 50°.

30. The optical lens of claim 29 additionally comprising a meniscus sharp adjacent to the meniscus wall, said sharp comprising a angular feature for containing the volume of saline solution and oil.

31. The optical lens of claim 30 wherein the sharp comprises a radial surface portion.

32. The optical lens of claim 31 wherein the radial surface portion comprises a radius in the range of 5 microns to 25 microns.

The invention claimed is:

1. An optical lens comprising:

a front lens comprising a front lens exterior surface and a front lens interior surface;

a back lens comprising a back lens interior surface and a back lens exterior surface said back lens positioned proximate to said front lens such that said front lens interior surface and said back lens interior surface form a cavity therebetween;

a volume of saline solution and oil contained within the cavity formed between said front lens interior surface and said back lens interior surface, said volume of saline solution and oil comprising a meniscus therebetween;

a meniscus wall comprising a first portion with a first dielectric thickness and a second portion with a second dielectric thickness, wherein the first dielectric thickness is greater than the second dielectric thickness and each of the first portion and the second portion border the meniscus formed between the saline solution and oil; and

a conductive coating on at least a portion of said meniscus wall wherein the volume of oil comprises density within about 10% of a density of the saline solution.

2. The optical lens of claim 1 wherein at least one of the front lens and the back lens is essentially flat.

3. The optical lens of claim 1 wherein the front lens and the back lens comprise an arcuate lens.

4. The optical lens of claim 3 additionally comprising a conductive coating on at least a portion of said meniscus wall.

5. The optical lens of claim 4 wherein the volume of oil comprises a density about equal to a density of the saline solution.

6. The optical lens of claim 4 wherein the volume of oil is less than the volume of saline solution contained within the cavity.

7. The optical lens of claim 6 wherein the volume of oil comprises about 66% or more by volume as compared to an amount of saline solution.

8. The optical lens of claim 6 wherein the volume of oil comprises about 90% or less by volume as compared to an amount of saline solution.

9. An optical lens comprising:

a front lens comprising a front lens exterior surface and a front lens interior surface;

a back lens comprising a back lens interior surface and a back lens exterior surface said back lens positioned proximate to said front lens such that said front lens interior surface and said back lens interior surface form a cavity therebetween;

a volume of saline solution and oil contained within the cavity formed between said front lens interior surface and said back lens interior surface, said volume of saline solution and oil comprising a meniscus therebetween;

a meniscus wall comprising a first portion with a first dielectric thickness and a second portion with a second dielectric thickness, wherein the first dielectric thickness is greater than the second dielectric thickness and each of the first portion and the second portion border the meniscus formed between the saline solution and oil; and

a conductive coating on at least a portion of said meniscus wall wherein the volume of oil comprises density within about 5% of a density of the saline solution.

10. The optical lens of claim 9 wherein the conductive coating extends from an area interior to the cavity to an area external to the cavity.

11. The optical lens of claim 10, wherein the area of conductive coating external to the cavity forms an electrical terminal for providing an electrical potential to the liquid meniscus lens.

12. The optical lens of claim 10 wherein the saline solution and the oil form a meniscus and an application of an electrical potential to the area of conductive coating external to the cavity causes a change in position of contact of the meniscus along the meniscus wall.

13. The optical lens of claim 10 wherein the electrical potential comprises a direct current.

14. The optical lens of claim 10 wherein the electrical potential comprises between about 5.0 volts to 60.0 volts.

15. The optical lens of claim 14 wherein the electrical potential comprises about 20.0 volts.

16. The optical lens of claim 14 wherein the electrical potential comprises about 5.0 volts.

17. The optical lens of claim 10 wherein the electrical potential comprises between about 3.5 volts to about 7.5 volts.

18. The optical lens of claim 10 wherein the front curve lens exterior surface comprises an optical power other than about 0.

19. The optical lens of claim 10 wherein the front curve lens interior surface comprises an optical power other than about 0.

20. The optical lens of claim 10 wherein the back curve lens exterior surface comprises an optical power other than about 0.

21. The optical lens of claim 10 wherein the back curve lens interior surface comprises an optical power other than about 0.

22. The optical lens of claim 10 additionally comprising a channel through one or both of the front curve lens and the back curve lens and a conductive material filling the channel.

23. The optical lens of claim 22 additionally comprising a terminal in electrical communication with the conductive material filling the channel.

24. The optical lens of claim 23 wherein application of an electrical potential to the terminal causes a change in the shape of the meniscus.

25. The optical lens of claim 10 additionally comprising an insulator coating along at least a portion of the interior surface of the front curve lens, wherein the insulator coating comprises an electrical insulator.

26. The optical lens of claim 25, wherein the insulator comprises one of Parylene C™ and Teflon AF.

27. The optical lens of claim 25 wherein the insulator comprises a boundary area to maintain separation between the conductive coating and a saline solution contained in the cavity between the front curve lens and the back curve lens.

28. The optical lens of claim 10 wherein an angle of the conical frustum comprising the meniscus wall comprises between about 30° and 50°.

29. The optical lens of claim 28 additionally comprising a meniscus sharp adjacent to the meniscus wall, said sharp comprising a angular feature for containing the volume of saline solution and oil.

30. The optical lens of claim 29 wherein the sharp comprises a radial surface portion.

31. The optical lens of claim 30 wherein the radial surface portion comprises a radius in the range of 5 microns to 25 microns.