WHAT IS CLAIMED IS:

1. A method of forming a biocompatible energization element, the method comprising:

receiving a first substrate film of a first insulating material;

receiving a second substrate film of a second insulating material;

cutting a cavity in the second substrate film to form a gap spacer layer;

cutting a cavity in the first substrate film to form a cathode spacer layer, wherein an edge of the cavity defines a sidewall of the cavity;

laminating a first surface of the gap spacer layer to a first surface of the cathode spacer layer;

placing a separator into the biocompatible energization element through the cavity in the gap spacer layer;

receiving an anode film;

adhering a second surface of the gap spacer layer to a first surface of the anode film;

receiving a cathode slurry; and

placing the cathode slurry into the cavity in the cathode spacer layer, wherein the sidewall of the cavity in the cathode spacer layer and a surface of the placed separator form a cavity to contain the cathode slurry.

2. The method of claim 1 further comprising:

receiving a cathode contact film; and

adhering a second surface of the cathode spacer layer to at least a portion of a first surface of the cathode contact film.

3. The method of claim 2 further comprising:

receiving a first packaging film comprising a film stack wherein one layer is a metallic moisture barrier; and

adhering the first packaging film to at least a portion of the cathode contact film.

4. The method of claim 3 further comprising:

receiving a second packaging film comprising a film stack wherein one film layer is a metallic moisture barrier; and

adhering the second packaging film to at least a portion of the anode film.

5. The method of claim 4 further comprising adhering the biocompatible energization element to a portion of a biomedical device.

6. The method of claim 2 wherein the biocompatible energization element is added to an insert of a biomedical device, wherein the biocompatible energization element is sealed within the insert.

7. The method of claim 6 wherein the biomedical device is a contact lens.

8. The method of claim 1 further comprising adding an electrolyte formulation upon the separator.

9. The method of claim 8 wherein the adding an electrolyte formulation upon the separator is performed before the placing of the cathode slurry.

10. The method of claim 1 wherein the cathode slurry comprises manganese dioxide.

11. The method of claim 10 wherein the manganese dioxide comprises electrolytic manganese dioxide.

12. The method of claim 11 further comprising processing of the cathode slurry to remove large particulates.

13. The method of claim 12 wherein particle sizes are less than approximately 70 microns.

14. The method of claim 13 wherein the particle sizes are less than approximately 25 microns.

15. The method of claim 12 wherein the processing to remove large particulates comprises ball milling.

16. The method of claim 12 wherein the processing to remove large particulates comprises jet milling.

17. The method of claim 1 wherein the first substrate film and the second substrate film are a same material.

18. The method of claim 17 wherein the same material is polyethylene terephthalate.

19. The method of claim 1 wherein the cutting a cavity in the first substrate film utilizes a laser.

20. The method of claim 1 wherein the method of adhering comprises activating a pressure-sensitive adhesive.

21. The method of claim 1 wherein multiple cavities are cut into the cathode spacer layer, and the separator is placed into at least two of the multiple cavities.

22. The method of claim 1 additionally comprising

electroplating a zinc layer upon the anode film before adhering the second surface, wherein the surface of the electroplated zinc layer subsequently becomes the first surface of the anode film.

23. The method of claim 1 further comprising:
electrically contacting the biocompatible energization element to an electronic circuit; and
electrically contacting the electronic circuit to an electroactive element of a biomedical device.

24. The method of claim 23 further comprising bending the device resulting from claim 23 to form a conical-shaped piece by joining, physically and electrically, two ends of the device resulting from claim 23.

25. A method of forming a biocompatible energization element, the method comprising:
receiving a first substrate film of a first insulating material;
cutting a cavity in the first substrate film to form a cathode spacer layer, wherein an edge of the cavity defines a sidewall of the cavity;
receiving an anode film;
receiving a separator film;
adhering a first surface of the separator film upon the anode film;
adhering a first surface of the cathode spacer layer to a second surface of the separator film;
receiving a cathode slurry; and
placing the cathode slurry into the cavity in the cathode spacer layer, wherein the sidewall of the cavity in the cathode spacer layer and the second surface of the separator film contain the cathode slurry.

26. The method of claim 25 further comprising:
receiving a cathode contact film; and

adhering a second surface of the cathode spacer layer to at least a portion of a first surface of the cathode contact film.

27. The method of claim 26 further comprising:

receiving a first packaging film comprising a film stack wherein one layer is a metallic moisture barrier; and

adhering the first packaging film to at least a portion of the cathode contact film.

28. The method of claim 27 further comprising:

receiving a second packaging film comprising a film stack wherein one film layer is a metallic moisture barrier; and

adhering the second packaging film to at least a portion of the anode film.

29. The method of claim 28 further comprising:

adhering the biocompatible energization element to a portion of a biomedical device.

30. The method of claim 26 wherein the biocompatible energization element is added to an insert of a biomedical device, wherein the biocompatible energization element is sealed within the insert.

31. The method of claim 30 wherein the biomedical device is a contact lens.

CLAIMS

1. A method of forming a biocompatible energization element (110), the method comprising:

receiving a first substrate film (403) of a first insulating material;

receiving a second substrate film (409) of a second insulating material;

cutting a cavity (406) in the second substrate film (409) to form a gap spacer layer (404);

cutting a cavity (410) in the first substrate film to form a cathode spacer layer (401), wherein an edge of the cavity defines a sidewall of the cavity;

laminating (408) a first surface of the gap spacer layer to a first surface of the cathode spacer layer (401);

placing a separator (422) into the biocompatible energization element (110) through the cavity (406) in the gap spacer layer (404);

receiving an anode film (425);

adhering a second surface of the gap spacer layer (404) to a first surface of the anode film (425);

receiving a cathode slurry (430); and

placing the cathode slurry (430) into the cavity (410) in the cathode spacer layer (401), wherein the sidewall of the cavity in the cathode spacer layer (401) and a surface of the placed separator (422) form a cavity to contain the cathode slurry (430).

2. The method of claim 1 further comprising:

receiving a cathode contact film (450); and

adhering a second surface of the cathode spacer layer (401) to at least a portion of a first surface of the cathode contact film (450).

3. The method of claim 2 further comprising:

receiving a first packaging film comprising a film stack wherein one layer is a metallic moisture barrier; and

adhering the first packaging film to at least a portion of the cathode contact

film (450).

4. The method of claim 3 further comprising:

receiving a second packaging film comprising a film stack wherein one film layer is a metallic moisture barrier; and

adhering the second packaging film to at least a portion of the anode film (425).

5. The method of claim 4 further comprising:

adhering the biocompatible energization element (110) to a portion of a biomedical device (100).

6. The method of claim 2 wherein the biocompatible energization element (110) is added to an insert of a biomedical device (100), wherein the biocompatible energization element (110) is sealed within the insert.

7. The method of claim 6 wherein the biomedical device (100) is a contact lens.

8. The method of claim 1 further comprising:

adding an electrolyte formulation (840) upon the separator (422).

9. The method of claim 8 wherein the adding an electrolyte formulation (840) upon the separator (422) is performed before the placing of the cathode slurry (430).

10. The method of claim 1 wherein the cathode slurry (430) comprises manganese dioxide.

11. The method of claim 10 wherein the manganese dioxide comprises electrolytic manganese dioxide.

12. The method of claim 11 further comprising:

processing of the cathode slurry (430) to remove large particulates.

13. The method of claim 12 wherein particle sizes are less than approximately 70 microns.

14. The method of claim 13 wherein the particle sizes are less than approximately 25 microns.

15. The method of claim 12 wherein the processing to remove large particulates comprises ball milling.

16. The method of claim 12 wherein the processing to remove large particulates comprises jet milling.

17. The method of claim 1 wherein the first substrate film (403) and the second substrate film (409) are a same material.

18. The method of claim 17 wherein the same material is polyethylene terephthalate.

19. The method of claim 1 wherein the cutting a cavity in the first substrate film (403) utilizes a laser.

20. The method of claim 1 wherein the method of adhering comprises activating a pressure-sensitive adhesive (530).

21. The method of claim 1 wherein multiple cavities are cut into the cathode spacer layer (401), and the separator (422) is placed into at least two of the multiple cavities.

22. The method of claim 1 additionally comprising

electroplating a zinc layer upon the anode film (425) before adhering the second surface, wherein the surface of the electroplated zinc layer subsequently becomes the first surface of the anode film (425).

23. The method of claim 1 further comprising:

electrically contacting the biocompatible energization element (110) to an electronic circuit; and

electrically contacting the electronic circuit to an electroactive element of a biomedical device (100).

24. The method of claim 23 further comprising:

bending the device resulting from claim 23 to form a conical-shaped piece by joining, physically and electrically, two ends of the device resulting from claim 23.

25. A method of forming a biocompatible energization element (110), the method comprising:

receiving a first substrate film (403) of a first insulating material;

cutting a cavity in the first substrate film (403) to form a cathode spacer layer (401), wherein an edge of the cavity defines a sidewall of the cavity;

receiving an anode film (425);

receiving a separator film (422) ;

adhering a first surface of the separator film (422) upon the anode film (425);

adhering a first surface of the cathode spacer layer (401) to a second surface of the separator film (422);

receiving a cathode slurry (430); and

placing the cathode slurry (430) into the cavity in the cathode spacer layer (401), wherein the sidewall of the cavity in the cathode spacer layer (401) and the second surface of the separator film (422) contain the cathode slurry (430).

26. The method of claim 25 further comprising:

receiving a cathode contact film (450); and

adhering a second surface of the cathode spacer layer (401) to at least a portion of a first surface of the cathode contact film (450).

27. The method of claim 26 further comprising:

receiving a first packaging film comprising a film stack wherein one layer is a metallic moisture barrier; and

adhering the first packaging film to at least a portion of the cathode contact film (450).

28. The method of claim 27 further comprising:

receiving a second packaging film comprising a film stack wherein one film layer is a metallic moisture barrier; and

adhering the second packaging film to at least a portion of the anode film (425).

29. The method of claim 28 further comprising:

adhering the biocompatible energization element (110) to a portion of a biomedical device (100).

30. The method of claim 26 wherein the biocompatible energization element (110) is added to an insert of a biomedical device (100), wherein the biocompatible energization element (110) is sealed within the insert.

31. The method of claim 30 wherein the biomedical device (100) is a contact lens.