CLAIMS

1. A biomedical device comprising:

an electroactive component;

a battery including an anode current collector, a cathode current collector, an anode comprising a zinc foil, a polymer electrolyte, wherein the polymer electrolyte comprises zinc ion and poly (vinylidene fluoride), and a cathode slurry deposit with electrolytic manganese dioxide, a polymeric binder, and carbon particles; and

a first biocompatible encapsulating layer, wherein the first biocompatible encapsulating layer encapsulates at least the electroactive component and the battery.

2. The biomedical device of claim 1,

wherein the anode and the anode current collector are a single layer.

3. The biomedical device of claim 1, wherein the electrolytic manganese dioxide comprises jet milled electrolytic manganese dioxide.

4. The biomedical device of claim 1, wherein the polymeric binder comprises poly(vinylidine fluoride).

5. The biomedical device of claim 1, wherein the carbon particles comprise carbon black.

6. The biomedical device of claim 1, wherein the battery comprises a seal in encapsulating films that enclose the battery portions not used for making external contacts.

7. The biomedical device of claim 1, wherein the thickness of the battery is less than 1 mm at least along a first dimension of the extents of the battery.

8. The biomedical device of claim 1, wherein the thickness of the battery is less than 500 microns at least along a first dimension of the extents of the battery.

9. The biomedical device of claim 1, wherein the thickness of the battery is less than 250 microns at least along a first dimension of the extents of the battery.

10. The biomedical device of claim 9, wherein the shape of the battery is curvilinear.

11. A method of manufacturing a battery comprising:

obtaining a cathode collector film, wherein the cathode collector film comprises titanium;
coating the cathode collector film with a carbon coating;
depositing a cathode slurry with electrolytic manganese dioxide, a polymeric binder, and carbon particlesupon the carbon coating;
drying the cathode slurry deposit;
forming a polymer electrolyte comprising zinc ion and poly (vinylidene fluoride);
laminating the polymer electrolyte to the cathode slurry deposit;
drying the polymer electrolyte;
laminating a zinc foil to the polymer electrolyte;
encapsulating the zinc foil, polymer electrolyte, cathode slurry deposit, and cathode collector in a biocompatible encapsulating film; and
singulating a battery element from the encapsulated zinc foil, polymer electrolyte, cathode slurry deposit, and cathode collector in a biocompatible encapsulating film.

12. The method of claim 11, wherein the singulated battery element has a thickness is less than 1 mm at least along a first dimension of the extents of the singulated battery element.

13. The method of claim 11, wherein the singulated battery element has a thickness is less than 500 microns at least along a first dimension of the extents of the singulated battery element.

14. The method of claim 11, wherein the singulated battery element has a thickness is less than 250 microns at least along a first dimension of the extents of the singulated battery element.

15. The method of claim 11, wherein the shape of the singulated battery element is curvilinear.

16. A method of energizing a biomedical device comprising:

obtaining a cathode collector film, wherein the cathode contact film comprises titanium;
coating the cathode collector film with a carbon coating;
depositing a cathode slurry with electrolytic manganese dioxide, a polymeric binder, and carbon particlesupon the carbon coating;
drying the cathode slurry deposit;
forming a polymer electrolyte comprising zinc ion and poly (vinylidene fluoride);
laminating the polymer electrolyte to the cathode slurry;
drying the polymer electrolyte;
laminating a zinc foil to the polymer electrolyte;
encapsulating the zinc foil, polymer electrolyte, cathode slurry deposit, and cathode collector in a first biocompatible encapsulating layer;
connecting the anode current collector to an electroactive device;
connecting the cathode current collector to the electroactive device;
encapsulating the laminar structure and electroactive device in a second biocompatible encapsulating layer to form a biomedical device.