Portland cement; precipitated metal silicates such as calcium silicate; hollow or solid polymer or glass microspheres, flakes and fibers; and the like.

"Functionalized" as used herein refers to making a layer or device able to perform a function including, for example, energization, activation, and/or control.

"Mold" as used herein refers to a rigid or semi-rigid object that may be used to form three-dimensional objects from uncured formulations. Some exemplary molds include two mold parts that, when opposed to one another, define the structure of a three-dimensional object.

"Power" as used herein refers to work done or energy transferred per unit of time.

"Rechargeable" or "Re-energizable" as used herein refer to a capability of being restored to a state with higher capacity to do work. Many uses may relate to the capability of being restored with the ability to flow electrical current at a certain rate for certain, reestablished time periods.

"Reenergize" or "Recharge" as used herein refer to restoring to a state with higher capacity to do work. Many uses may relate to restoring a device to the capability to flow electrical current at a certain rate for a certain reestablished time period.

"Released" as used herein and sometimes referred to as "released from a mold" means that a three-dimensional object is either completely separated from the mold, or is only loosely attached to the mold, so that it may be removed with mild agitation.

"Stacked" as used herein means to place at least two component layers in proximity to each other such that at least a portion of one surface of one of the layers contacts a first surface of a second layer. In some examples, a coating, whether for adhesion or other functions, may reside between the two layers that are in contact with each other through said coating.

"Traces" as used herein refer to energization element components capable of connecting together the circuit components. For example, circuit traces may include copper or gold when the substrate is a printed circuit board and may typically be copper, gold or printed film in a flexible circuit. A special type of trace is the current collector. Current collectors are traces with electrochemical compatibility that make the current collectors suitable for use in conducting electrons to and from a cathode or anode of an electrochemical cell.

“Chemistry” as used herein means the ‘material’ employed for example ‘anode chemistry’ means the material forming the anode or ‘anode material’.

CLAIMS

1. A battery comprising:

an anode current collector, wherein the anode current collector is a first metallic tube closed on a first end;

an anode, wherein the anode chemistry is contained within the first metallic tube;

a cathode current collector, wherein the cathode current collector is a second metallic tube closed on a second end;

a cathode, wherein the cathode chemistry is contained within the second metallic tube;

a tube with a first sealing surface that sealably interfaces with the first metallic tube and a second sealing surface that sealably interfaces with the second metallic tube; and

a sealing material located in a gap between the first sealing surface and first metallic tube, wherein the sealing material located in the gap between the first sealing surface and the first metallic tube comprises either a first layer comprising molybdenum and manganese particles in a mixture with ceramic powders which is then plated with a metallic film or of a PVD deposited metallic film.

2. The battery of Claim 2, wherein the tube is made from either ceramic or glass.

3. The battery of Claim 1 or Claim 2 wherein the sealing material located in the gap between the first sealing surface and the first metallic tube comprises an epoxy adhesive.

4. The battery of Claim 1 wherein the metallic film comprises either nickel or titanium.

5. The battery of Claim 4 wherein a noble metallic film is additionally deposited upon the PVD deposited metallic film.

6. The battery of Claim 1 or Claim 2 wherein the sealing material located in the gap between the first sealing surface and the first metallic tube comprises a plurality of thin layers of metallic films, wherein a first thin layer of metallic film is deposited upon a second layer of metallic film, wherein the first thin layer of metallic film is chemically reactive with the second layer of

metallic film releasing energy to rapidly heat the layers, and wherein the chemical reaction is activated by an energetic pulse of energy.

7. The battery of Claim 6 wherein the energetic pulse comprises photons.

8. The battery of Claim 6 wherein the energetic pulse comprises electrons.

9. The battery of Claim 6 wherein the energetic pulse comprises thermal energy.

10. The battery of Claim 1 or Claim 2 wherein the sealing material located in the gap between the first sealing surface and the first metallic tube comprises a conventional solder alloy base with an addition of titanium, wherein the titanium reacts with surface materials of the tube upon exposure to ultrasonic energy.

11. A battery comprising:

an anode current collector, wherein the anode current collector is a first metallic tube closed on a first end;

an anode, wherein the anode chemistry is contained within the first metallic tube;

a cathode current collector, wherein the cathode current collector is wire;

a ceramic end cap with a first sealing surface that sealably interfaces with the first metallic tube and a second sealing surface that sealably interfaces with the cathode current collector;

a cathode, wherein the cathode chemistry is deposited upon the cathode current collector; and

a sealing material located in a gap between the first sealing surface and first metallic tube wherein the sealing material located in the gap between the first sealing surface and the first metallic tube comprises either a first layer comprising molybdenum and manganese particles in a mixture with ceramic powders which is then plated with a metallic film or of a PVD deposited metallic film.

12. A battery comprising:

an anode current collector, wherein the anode current collector is a first semiconductor tube closed on a first end and doped on the first end;

an anode, wherein the anode chemistry is contained within the first semiconductor tube;

a cathode current collector, wherein the cathode current collector is a second semi-conductor tube closed on a second end and doped on the second end;

a cathode, wherein the cathode chemistry is deposited upon the cathode current collector; and

a sealing material located in a gap between the first semiconductor tube and the second semiconductor tube,

wherein the sealing material located in the gap between the first semiconductor tube and the second semiconductor tube comprises a either a first layer comprising molybdenum and manganese particles in a mixture with ceramic powders which is then plated with a metallic film or a first layer of a PVD deposited metallic film.

13. The battery of Claim 12 wherein the sealing material located in the gap between the first semiconductor tube and the second semiconductor tube comprises an epoxy adhesive.

14. The battery of Claim 12 wherein the metallic film comprises nickel or titanium.

15. The battery of Claim 14 wherein a noble metallic film is additionally deposited upon the PVD deposited metallic film.

16. The battery of Claim 12 wherein the sealing material located in the gap between the first semiconductor tube and the second semiconductor tube comprises a plurality of thin layers of metallic films, wherein a first thin layer of metallic film is deposited upon a second layer of metallic film, wherein the first thin layer of metallic film is chemically reactive with the second layer of metallic film releasing energy to rapidly heat the layers, and wherein the chemical reaction is activated by an energetic pulse of energy.

17. The battery of Claim 16 wherein the energetic pulse comprises photons, electrons or thermal energy.

18. The battery of Claim 12 wherein the sealing material located in the gap between the first semiconductor tube and the second semiconductor tube comprises a conventional solder alloy base with an addition of titanium, wherein the titanium reacts with surface materials of the first semiconductor tube and the second semiconductor tube upon exposure to ultrasonic energy.

19. A biomedical device incorporating a battery as claimed in any one of the preceding Claims, comprising:

an electroactive component; and

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

20. A method of manufacturing a battery comprising:

obtaining a cathode collector tube;

filling the cathode collector tube with cathode chemicals;

obtaining an anode collector tube;

filling the anode collector tube with anode chemicals;

obtaining a tube form ceramic insulator piece;

forming a first and second sealing surface on each end of the tube form ceramic insulator piece;

evaporating a metal film upon the first and second sealing surface;

coating the end of the cathode collector tube with a piece of Nanofoil;

coating the metal film upon the first and second sealing surface with a solder paste;

positioning the cathode collector tube over the first sealing surface;

activating the Nanofoil to cause a rapid temperature increase at an interface between the cathode collector tube and the first sealing surface and melting the solder paste.