CLAIMS

What is claimed is:

1. A method for securing an electrolyte solution upon emergency in an electrolyte electrochemical cell(s) compartment(s) of a battery and optionally in an electrolyte compartment connected to said battery, said method comprises adding a reagent to said electrolyte solution, wherein said reagent and said electrolyte interact in said cell(s) compartment(s) / in said electrolyte compartment(s), such that following said interaction, said electrolyte cannot flow.
2. The method of claim 1, wherein said reagent comprises a foam, a gel, a porous material, or a precursor thereof.
3. The method of claim 1, wherein said reagent forms a porous solid or semi-solid material such that said electrolyte solution is contained in the pores of said material.
4. The method of claim 3, wherein said reagent is a polymer or a polymer precursor.
5. The method of claim 4, wherein said polymer or polymer precursor comprises isocyanate or polyisocyanate, isocyanourate or polyisocyanourate, polyols or compositions thereof, polyisocyanate prepolymer or polyisocyanourate prepolymer.
6. The method of claim 5, wherein said porous solid material formed from said isocyanate or polyisocyanate, isocyanourate or polyisocyanourate, polyols, and compositions thereof, polyisocyanate prepolymer or polyisocyanourate prepolymer is polyurethane foam.
7. The method of claim 1, wherein prior to addition of said reagent to said electrolyte, said electrolyte is kept in said electrolyte electrochemical cell(s) compartment(s) and optionally in said electrolyte compartment, and said reagent is kept in a reagent compartment.
8. The method of claim 7, wherein said electrolyte electrochemical cell(s) compartment(s) and optionally said electrolyte compartment are placed in contact or are connected by a connection to said reagent compartment.
9. The method of claim 8, wherein the area of said contact between said electrolyte electrochemical cell(s) compartment(s) and optionally said electrolyte compartment and between said reagent compartment or a portion thereof is opened upon emergency such that materials from said compartments are mixed.

10. The method of claim 8, wherein said connection between said compartment(s) can assume an open position or a closed position.

11. The method of claim 8, wherein upon opening of said connection, said reagent is transferred to said electrolyte.

12. The method of claim 8, wherein said reagent compartment further comprises a gas propellant, said gas propellant facilitating transfer of said reagent from said reagent compartment to said electrolyte electrochemical cell(s) compartment(s) and optionally to said electrolyte compartment.

13. The method of claim 1, wherein said reagent is absorbent.

14. The method of claim 13, wherein said reagent forms a gel upon contact with said electrolyte.

15. The method of claim 13, wherein said reagent comprises superabsorbent polymers.

16. The method of claim 15, wherein said superabsorbent polymers comprise cellulose-based polymers, polyacrylate-based polymers, polyacrylonitrile-based polymers, combinations thereof and compositions thereof.

17. The method of claim 13, wherein said absorbent reagent comprises polymerizable polymers or compositions thereof.

18. The method of claim 17, wherein said polymerization comprises crosslinking of said polymers/polymer precursors.

19. A system comprising:

- a battery comprising electrochemical cell(s) compartment(s) and optionally an electrolyte compartment; and
- a reagent compartment for storing a reagent;

wherein said reagent compartment is in contact with or is connected by a connection to said electrochemical cell(s) compartment(s), to said electrolyte compartment or to a combination thereof.

20. The system of claim 19, wherein said connection can assume an open or a closed position.

21. The system of claim 19, wherein the area or portions thereof of said contact between said reagent compartment and said electrochemical cell(s) compartment(s), said electrolyte compartment or a combination thereof, is opened upon emergency such that

material from said reagent compartment is mixed with electrolyte within said electrochemical cell(s) compartment(s), within said electrolyte compartment or within a combination thereof.

22. The system of claim 19, wherein said reagent compartment further comprises a gas propellant.

23. The system of claim 19, wherein said connection is normally-closed and upon an emergency or accident, said connection is turned open.

24. The system of claim 23, wherein said emergency or accident condition is sensed by a sensor within said system or external to said system, and wherein said connection is turned open upon receiving a signal from said sensor.

25. The system of claim 24, wherein said signal is processed by a processor, and wherein said processor activates or controls activation of the opening of said connection.

26. The system of claim 23, wherein upon opening of said connection, said reagent is transferred spontaneously into said electrochemical cell(s) compartment(s), to said electrolyte compartment or to a combination thereof.

27. The system of claim 22, wherein said reagent compartment comprises said reagent and said gas propellant, such that said gas propellant facilitates ejection of said reagent from said reagent compartment and into said electrochemical cell(s) compartment(s), to said electrolyte compartment or to a combination thereof.

28. The system of claim 27, wherein the pressure of said gas propellant in said reagent compartment is higher than the gas pressure in said electrochemical cell(s) compartment(s), in said electrolyte compartment or in combination thereof.

29. The system of claim 19, wherein upon opening of said connection, said reagent is transferred using a transferring means into said electrochemical cell(s) compartment(s), to said electrolyte compartment or to a combination thereof.

30. The system of claim 29, wherein said transferring means comprising a pump.

31. The system of claim 19, wherein said electrochemical cell(s) compartment(s), said electrolyte compartment or a combination thereof, comprises an inner layer and an outer layer, said inner layer comprises said electrolyte and said outer layer comprises said reagent compartment for storing said reagent.

32. The system of claim 31, wherein said reagent is mixed with said electrolyte upon a break or puncture in said electrochemical cell(s) compartment(s), in said electrolyte compartment or a combination thereof.

33. The system of claim 19, wherein said reagent forms a porous solid or semi-solid material, a gel or foam upon contact with said electrolyte, and wherein said foam is a quickly-setting foam.

34. The system of claim 19, wherein said system further comprises a container comprising a blowing agent.

35. The system of claim 34, wherein said blowing agent is transferred with said reagent into said electrochemical cell(s) compartment(s), to said electrolyte compartment or to a combination thereof, such that said blowing agent blows up said reagent or products thereof thus forming a porous material.

36. The system of claim 19, further comprising control sensors selected from the group consisting of a temperature gauge, a pressure gauge, a humidity gauge, a position gauge, an accelerometer or a combination thereof.

37. The system of claim 19, wherein said system is activated in response to signals from external controllers such as a car controller, an accelerometer, an air bag activator or a combination thereof.

38. A method for securing an electrolyte solution in a battery upon emergency, the method comprising:

- providing a battery comprising:
  - electrochemical cell(s) compartment(s) comprising an electrolyte;
  - optionally an electrolyte compartment comprising an electrolyte;
- providing a reagent compartment for storing a reagent;

wherein said reagent compartment is in contact with or is connected by a connection to said electrochemical cell(s) compartment(s), to said electrolyte compartment or to a combination thereof;

- bringing into contact said reagent from said reagent compartment with said electrolyte in said electrochemical cell(s) compartment(s), optionally with said electrolyte in said electrolyte compartment, or with a combination thereof, thus securing said electrolyte.

39. The method of claim 39, wherein said contact between said reagent and said electrolyte is achieved by opening said connection, or by opening at least a portion of the contact area between said reagent compartment and said electrochemical cell(s) compartment(s), said electrolyte compartment or a combination thereof.

40. The method of claim 1, wherein said securing said electrolyte comprises keeping the electrolyte in a safe form/environment, capture the electrolyte, arrest the electrolyte, confine it within the pores of a porous material or within a gel, consume the electrolyte into another material, break apart, divide into small portions, use of the electrolyte in the production of a solid/semi solid/gel material, lock, protect, close, fix, attach, seize from moving/flowing, make use of, detain, encapsulate, trap or grab hold of the electrolyte.

41. The method of claim 2, wherein said foam comprises a rigid or semi-rigid polymer foam and wherein said porous material comprises porous solid or semi solid material.

42. The method of claim 42, wherein said foam or said porous solid or semi solid material comprises a quickly setting foam/polymer.

CLAIMS

1. A method for securing upon emergency an electrolyte solution present in an electrochemical cell(s) compartment(s) of a battery, and optionally in an electrolyte compartment connected to said battery, said method comprising: adding a reagent to said electrolyte solution, wherein said reagent and said electrolyte interact in said cell(s) compartment(s), and optionally in said electrolyte compartment, such that following said interaction, a porous solid, foam or gel is formed in said electrochemical cell(s) compartment(s) and optionally in said electrolyte compartment, such that said electrolyte cannot flow and spill from said electrochemical cell(s) compartment(s), and optionally from said electrolyte compartment.

2. The method of claim 1, wherein said reagent comprises a foam, a gel, a porous material, or a precursor thereof.

3. The method of claim 1, wherein said reagent forms a porous solid or semi-solid material such that said electrolyte solution is contained in the pores of said material and wherein said reagent is a polymer or a polymer precursor.

4. The method of claim 3, wherein said polymer or polymer precursor comprises isocyanate or polyisocyanate, isocyanourate or polyisocyanourate or compositions thereof, polyisocyanate prepolymer or polyisocyanourate prepolymer.

5. The method of claim 4, wherein said porous solid material formed from said isocyanate or polyisocyanate, isocyanourate or polyisocyanourate, polyols, and compositions thereof, polyisocyanate prepolymer or polyisocyanourate prepolymer is polyurethane foam.

6. The method of claim 1, wherein prior to addition of said reagent to said electrolyte, said electrolyte is kept in said electrochemical cell(s) compartment(s) and optionally in said electrolyte compartment, and said reagent is kept in a reagent compartment and wherein said electrochemical cell(s) compartment(s) and optionally said electrolyte compartment are placed in contact or are connected by a connection to said reagent compartment; and

   wherein the area of said contact between said electrochemical cell(s) compartment(s) and optionally said electrolyte compartment and between the reagent

compartment or a portion thereof is opened upon emergency such that materials from said electrochemical cell(s) compartment(s) and optionally from said electrolyte compartment and materials from said reagent compartment are mixed.

7. The method of claim 6, wherein said reagent compartment further comprises a gas propellant, said gas propellant facilitating transfer of said reagent from said reagent compartment to said electrochemical cell(s) compartment(s) and optionally to said electrolyte compartment.

8. The method of claim 1, wherein said reagent is absorbent.

9. The method of claim 8, wherein said reagent forms a gel upon contact with said electrolyte.

10. The method of claim 8, wherein said reagent comprises superabsorbent polymers that can absorb between 50- 500 times their weight.

11. The method of claim 10, wherein said superabsorbent polymers comprise cellulose-based polymers, polyacrylate-based polymers, polyacrylonitrile-based polymers, combinations thereof and compositions thereof.

12. A system comprising:
    - a battery comprising electrochemical cell(s) compartment(s) and optionally an electrolyte compartment; and
    - a storage unit for storing a reagent;

    wherein said storage unit is in contact with or is connected by a connection to said electrochemical cell(s) compartment(s), to said electrolyte compartment or to a combination thereof; and

    wherein the area or portions thereof of said contact or connection between said storage unit and between said electrochemical cell(s) compartment(s), said electrolyte compartment or a combination thereof, comprises an opening and is opened upon emergency such that material from said storage unit is mixed with electrolyte within said electrochemical cell(s) compartment(s), within said electrolyte compartment or within a combination thereof, and wherein said electrolyte does not spill from said electrochemical cell(s) compartment(s), nor optionally from said electrolyte compartment.

13. The system of claim 12, wherein said storage unit further comprises a gas propellant such that said gas propellant facilitates ejection of said reagent from said storage unit and into said electrochemical cell(s) compartment(s), to said electrolyte compartment or to a combination thereof.

14. The system of claim 12, wherein said connection is closed and upon an emergency or accident, said connection is turned open, and wherein upon opening of said connection, said reagent is transferred spontaneously into said electrochemical cell(s) compartment(s), into said electrolyte compartment or to a combination thereof.

15. The system of claim 12, wherein said reagent forms a porous solid or semi-solid material, a gel or foam upon contact with said electrolyte.