CLAIMS

1. Battery comprising:

- at least one unit cell, said unit cell successively comprising an anode current-collecting substrate, an anode layer, a layer of an electrolyte material or of a separator impregnated with an electrolyte, a cathode layer, and a cathode current-collecting substrate,

bearing in mind that in the case whereby said battery comprises a plurality of unit cells, the second is placed on top of the first in the indicated order for the layers, and so forth,

- an encapsulation system covering at least part of the outer periphery of said unit cell, or of all of the unit cells where a plurality thereof are present

- at least one anode contact member, intended to make the electrical contact between at least the unit cell and an external conductive element, said battery comprising a first contact surface comprising at least one anode connection zone,

- and at least one cathode contact member intended to make the electrical contact with an external conductive element, said battery comprising a second contact surface comprising at least one cathode connection zone,

said battery being characterised in that the encapsulation system further comprises on the external periphery of the battery:

- at least an impervious layer, having a water vapour permeance (WVTR) of less than 10^{-5} g/m^2.d, said impervious layer being made of a ceramic material and/or a glass with a melting point below 600°C

2. Battery according to claim 1, characterised in that the impervious layer has a thickness comprised between 1 µm and 50 µm,
3. Battery according to claim 2, characterized in that the impervious layer has a thickness comprised between 1 µm and 10 µm.
4. Battery according to one of claims 1 to 3, characterised in that the encapsulation system further comprises a cover layer, chosen from among parylene, parylene F, polyimide, epoxy resins, silicone, polyamide, sol-gel silica, organic silica and/or a mixture thereof, covering at least part of the outer periphery of said unit cell, or of all the unit cells where a plurality thereof are present.

5. Battery according to one of claims 1 to 4, characterised in that the encapsulation system further comprises a coating layer consisting of an electrically insulating material, deposited by atomic layer deposition on at least part of the outer periphery of said unit cell, or of all the unit cells where a plurality thereof are present, or on the cover layer when said cover layer is present.
6. Battery according to claim 5, characterized in that a succession of a coating layer and an impervious layer is repeated z times, where $z \geq 1$, with the understanding that the last layer of the encapsulation system is said impervious layer, having a water vapour permeance (WVTR) of less than 10^{-5} $g/m^2.d$, which is made of ceramic material and/or a glass with a melting point below 600°C.

7. Battery according to one of claims 1 to 6, characterised in that each of the anode and cathode contact members comprises:
- a first electrical connection layer, disposed on at least the anode connection zone and at least the cathode connection zone, this first layer comprising a material filled with electrically conductive particles,
- a second electrical connection layer comprising a metal foil disposed on the first layer of material filled with electrically conductive particles.
8. Battery according to claim 7, wherein the metal foil is of the free-standing type.
9. Battery according to one of claims 7 or 8, wherein the metal foil is produced by rolling or electroplating.
10. Battery according to one of claims 7 to 9, characterised in that the thickness of the metal foil is comprised between 5 and 200 micrometres, this metal foil being made from one of the following materials: nickel, stainless steel, copper, molybdenum, tungsten, vanadium, tantalum, titanium, aluminium, chromium and the alloys comprising same.
11. Battery according to one of claims 7 to 10, characterised in that each of the anode and cathode contact members comprises a third electrical connection layer comprising a conductive ink disposed on the second electrical connection layer.
12. Battery according to one of claims 1 to 11, further comprising:
- an electrical connection support, made at least in part of a conductive material, which support is provided near an end face of a unit cell

- electrical insulation means, enabling two distant regions of this connection support to be insulated from one another, these distant regions forming respective electrical connection paths,

- said anode contact member enabling a first lateral face of each unit cell to be electrically connected to a first electrical connection path, whereas said cathode contact member enables a second lateral face of each unit cell to be electrically connected to a second electrical connection path.

13. Battery according to claim 12, wherein the electrical connection support is of the single-layer type.

14. Battery according to claim 12, wherein the electrical connection support comprises a plurality of layers disposed one below the other.

15. Battery according to any one of claims 12 to 14, wherein the impervious layer comprises a primary layer, not covering the anode and cathode contact members, respectively, as well as an additional layer, covering all or part of the contact members and at least partially covering the electrical connection support.

16. Battery according to any one of claims 1 to 15, characterised in that it is a lithium-ion battery.

17. Battery according to any one of claims 1 to 16, characterised in that it is a solid-state lithium-ion battery.

18. Battery according to one of claims 1 to 17, characterised in that it is designed and dimensioned to have a capacity of less than or equal to 1 mA h.

19. Battery according to one of claims 1 to 17, characterised in that it is designed and dimensioned to have a capacity of greater than 1 mA h.

20. Method of manufacturing a battery according to one of claims 1 to 19, said manufacturing method comprising:

a) supplying at least one anode current-collecting substrate foil coated with an anode layer, hereinafter referred to as an anode foil,

b) supplying at least one cathode current-collecting substrate foil coated with a cathode layer, hereinafter referred to as a cathode foil,

at least one of the anode foil or the cathode foil comprising a layer of an electrolyte material or a separator impregnated with an electrolyte,

c) producing a stack (I) alternating at least one anode foil and at least one cathode foil to successively obtain at least one anode current-collecting substrate, at least one anode layer, at least one layer of an electrolyte material or of a separator impregnated with an electrolyte, at least one cathode layer, and at least one cathode current-collecting substrate,

d) heat treating and/or mechanically compressing the stack of alternating foils obtained in step c), so as to form a consolidated stack,

e) carrying out a step of encapsulating the consolidated stack, by depositing:

- at least an impervious layer of an encapsulation system having a water vapour permeance (WVTR) of less than 10^{-5} g/m^2.d, this impervious layer being made of a ceramic material and/or a glass with a melting point below 600°C, deposited at the outer periphery of the battery,

f) making two cuts (Dn, D'n) so as to form a cut stack exposing a first contact surface comprising at least an anode connexion zone and a second contact surface comprising at least a cathode connection zone,

g) producing anode and cathode contact members.

21. Method according to claim 20, wherein step e) further comprises depositing at least one cover layer, chosen from parylene, parylene F, polyimide, epoxy resins, silicone, polyamide, sol-gel silica, organic silica and/or a mixture thereof, on the consolidated stack.

22. Method according to claims 20 or 21, wherein step e) further comprises depositing a coating layer, consisting of an electrically insulating material, deposited by atomic layer deposition on the consolidated stack or on the cover layer when said cover layer is present.

23. Method according to claim 22, characterised in that the coating layer is deposited by PECVD.

24. Method according one of claims 22 or 23, characterised in that the coating layer comprises oxides and/or nitrides and/or Ta_2O_5 and/or oxynitrides and/or SixNy and/or SiO_2 and/or SiON and/or amorphous silicon and/or SiC.

25. Method according to one of claims 22 to 24, wherein at least one succession of a coating layer and an impervious layer is deposited, this succession can be repeated z times, where z ≥ 1, and with the understanding that the last layer of the encapsulation system is said impervious layer having a vapour permeance (WVTR) of less than 10^{-5} g/m^2.d, which is made of a ceramic material and/or a glass with a melting point below 600°C.

26. Method according to one of claims 20 to 25, wherein the production of the anode and cathode contact members comprises

- depositing, on at least the anode connection zone and at least the cathode connection zone, a first electrical connection layer made of a material filled with electrically conductive particles,
- depositing, a second electrical connection layer disposed on the first electrical connection layer, said second electrical connection layer preferably being a metal foil or a metal ink.

27. Method according to claim 26, wherein the metal foil is formed by rolling, and then this metal foil thus formed is applied to the first electrical connection layer.

28. Method according to claim 26, wherein the metal foil is formed directly by electroplating, either *ex situ* or *in situ* with respect to the first metal connection layer.

29. Method according to one of claims 26 to 28, wherein the method comprises, after step g), on at least the anode and cathode connection zones of the battery, coated with the first and second electrical connection layer, a step h) of depositing a conductive ink.

30. Method according to one of claims 26 to 29, wherein the first electrical connection layer is deposited on at least the first contact surface comprising at least the anode connection zone and on at least the second contact surface comprising at least the cathode connection zone.

31. Method according to one of claims 20 to 30, characterised in that the glass with a melting point below 600 °C is chosen from among SiO_2-B_2O_3; Bi_2O_3-B_2O_3, ZnO-Bi_2O_3-B_2O_3, TeO_2-V_2O_5, and PbO-SiO_2.

32. Method according to one of claims 20 to 31 in which the encapsulation system is produced after an electrical connection support made at least in part of a conductive material has been placed near an end face of the stack (I).

33. Method according to one of claims 20 to 31, wherein at least part of the encapsulation system is formed before an electrical connection support made at least in part of a conductive material is placed near an end face of the stack (I).

34.Method according to the preceding claim, wherein a primary layer of the impervious layer, is formed before the electrical connection support is placed near the end face of the stack (I), then an additional layer of the impervious layer is formed after said electrical

connection support has been placed near said end face, the additional layer covering all or part of the contact members and at least partially covering the electrical connection support.

35. Method according to one of claims 20 to 34, further comprising

- supplying a frame (105) intended to form a plurality of electrical connexion supports (5),
- placing said frame near the end face of a plurality of unit stacks, these stacks being arranged in a plurality of lines and/or a plurality of rows
- making at least one cut, in the longitudinal direction and/or lateral direction of these stacks (I), so as to form a plurality of electrochemical devices.

36. Electric energy-consuming device (1000) comprising a body (1002) and a battery according to one of claims 12 to 19, said battery being capable of supplying electric energy to said electric energy-consuming device, and said electric connection support (5) of said battery being fastened to said body.