CLAIMS

1. A microbattery, comprising:

a microbattery structure formed in a stack, the stack comprising multiple surfaces; fashioned using multiple layers, the multiple layers including a substrate layer and a cover plate layer, a face side of the multiple surfaces being a surface of the substrate layer, a second side of the multiple surfaces being a surface of the cover plate layer, the face and second sides on opposite sides of the stack, and side surfaces of the multiple surfaces being opposite edges of the stack spanning between the surfaces of the first and second layers;

a first terminal on one of the surfacesface side and coupled to an anode of a battery in the microbattery structure;

a second terminal on one of the surfacesface side and coupled to a cathode of the battery in the microbattery structure; and

a metal-containing film covering at least one of the side surfaces, at least a portion of the second surface adjacent the edges, and a portion of the face layer of the stack but not covering the first or second terminals.

2. The microbattery of claim 1, wherein the metal-containing film comprises solder.

3. The microbattery of claim 1, wherein the multiple surfaces comprise two side surfaces and the metal-containing film covers at least the two sides of the surfaces of the stack.:

4. The microbattery of claim 3, wherein the multiple surfaces comprises a face side where the first and second terminal are located, and another side opposite the face side, and wherein the metal-containing film additionally covers the other side of the stack.

5. The microbattery of claim 4, wherein:

the stack comprises layers of athe substrate, a polymer, and a cover plate, and the cover plate layer is on the other side of the stack, and the second side is completely covered by the metal--containing film;

the stack has a length between the face and the substrate is on the face side;

the stack has a length between the twosecond sides and the layers are parallel along the length;

at least the polymer and cover plate layers are removed from above regions of the substrate that are adjacent edges of the microbattery;

the metal-containing film comprises a metal; and

a solder film covers surfaces of the metal-containing film.; and

6. the substrate on the face side has part of its surface not covered by the metal-containing film or the solder film, the part comprising the first and second terminals.

4. The microbattery of claim 51, wherein the substrate is thicker at about a midpoint of the length and thinner at ends of the :

the stack and at least the polymer and top covercomprises layers are removed from above thinner regions of the substrate that are adjacent edges of the microbattery.

7. The microbattery of claim 4, wherein:

the stack comprises layers of a substrate, a polymer, and athe cover plate, and the cover plate layer is on the othersecond side of the stack andis completely covered by the metal-containing film and the substrate is on the face side;

the stack has a length between the twoface and second sides and the layers are parallel along the length;

the metal-containing film comprises a metal;

a solder film covers surfaces of the metal-containing film; and

a polymer covers surfaces of the solder film;

the substrate on the face side has a surface notis at least partly covered by the metal-containing film orwith adhesive, and the solder film.part covered with adhesive on the face side comprises the first and second terminals coupled to through-vias that extend through the substrate layer;

a polymer film covers surfaces of the solder film and a surface of the adhesive opposite a surface of the adhesive that covers the substrate; and

openings are formed in the polymer film to uncover at least a portion of corresponding terminals.

8. 5. The microbattery of claim 4, wherein: the openings are filled with a conductor.

6. The microbattery of claim 1, wherein:

the stack comprises layers of athe substrate, a polymer, and a cover plate, and the cover plate layer is on, and the othersecond side of the stack andis completely covered by the metal- containing film and the substrate is on the face side;

the stack has a length between the two sides and the layers are parallel along the length;

the metal-containing film comprises a metal;

a solder film covers surfaces of the metal-containing film; a polymer covers surfaces of the solder film;

the substrate on the face side is at least partly covered with adhesive, and the face side comprises two terminals coupled to through-vias that extend through the substrate layer;

a polymer film covers surfaces of the solder film and a surface of the adhesive opposite a surface of the adhesive that covers the substrate; and

openings are formed in the polymer film to uncover at least a portion of corresponding terminals.

9. The microbattery of claim 8, wherein the openings are filled with a conductor.

10. The microbattery of claim 4, wherein:

the stack comprises layers of a substrate, a polymer, and a cover plate, and the cover plate layer is on the other side of the stack and covered by the metal- containing film and the substrate is on the face side;

the stack has a length between the two sides and the layers are parallel along the length;

the metal-containing film comprises solder; and

the metal-containing film covers athe portion of the substrate and a rest of the substrate has a surface not covered by the metal-containing film and including the first and second terminals.

11. 7. The microbattery of claim 1, wherein a thickness of the microbattery ranges in thickness from 0.01mm01 mm to 1mm1 mm.

12. A method for forming microbatteries, comprising:

mounting a thin-film battery panel onto a handler, the thin-film battery panel comprising a stack having multiple microbattery structures formed therein, wherein the thin-film battery panel has a surface on an adhesive layer, and the adhesive layer is on a release layer that is on the handler, wherein the

stack comprises layers of a substrate, a polymer, and a cover plate;

cutting through multiple layers of the stack to at least partially separate the multiple microbattery structures;

molding solder on surfaces of the multiple layers of the stack that have been cut through; and

singulating the multiple microbattery structures into corresponding individual microbattery cells.

13. The method of claim 12, wherein:

cutting through multiple layers of the stack to at least partially separate the multiple microbattery structures cuts through multiple layers of the stack but leaves at least part of a layer between the multiple microbattery structures;

molding solder on surfaces of the multiple layers of the stack that have been cut through further comprises:

forming a seed layer on exposed surfaces of the stack that have been cut through;

singulating the multiple microbattery structures into cells; and

molding solder on exposed surfaces of the singulated cells, the molding solder resulting in singulated cells attached to the handler via the adhesive layer;

singulating the multiple microbattery structures into corresponding individual microbattery cells further comprises releasing by using a laser release of the cells to form the individual microbattery cells.

14. The method of claim 12, wherein:

the mounting comprises mounting the thin-film battery panel onto the handler wherein islands of the adhesive layer have been formed on the release layer, and the islands substantially align with and are formed to cover corresponding microbattery structures;

cutting through multiple layers of the stack to at least partially separate the multiple microbattery structures cuts through all layers of the stack to singulate the microbattery structures into cells;

molding solder on surfaces of the multiple layers of the stack that have been cut through further comprises:

forming a seed layer on exposed surfaces of the singulated cells; and molding solder on exposed surfaces of the singulated cells;

singulating the multiple microbattery structures into corresponding individual microbattery cells further comprises releasing by using a laser release of the cells to form the individual microbattery cells.

15. The method of claim 14, wherein molding the solder is performed via one or both of plating or

molding using injection molding.

16. The method of claim 12, wherein:

the mounting comprises mounting the thin-film battery panel onto the handler wherein islands of the adhesive layer have been formed on the release layer, and the islands substantially align with and are formed to cover corresponding microbattery structures, and wherein the adhesive layer is on a polymer film and the polymer film is on the release layer that is on the handler;

cutting through multiple layers of the stack to at least partially separate the multiple microbattery structures cuts through all layers of the stack to singulate the microbattery structures into cells, but does cut completely through the polymer film;

molding solder on surfaces of the multiple layers of the stack that have been cut through further comprises:

forming a seed layer on exposed surfaces of the singulated cells;

molding solder on exposed surfaces of the singulated cells, the molding solder performed so the solder is removed from exposed surfaces of the polymer film;

the method further comprises performing overmolding of polymer over exposed surfaces of the solder and over exposed surfaces of the second polymer layer, wherein the performing overmolding fills unfilled locations between the singulated cells and bonds the overmolded polymer to the polymer film on the release layer to create a single polymer film; and

singulating the multiple microbattery structures into corresponding individual microbattery cells further comprises singulating the cells by cutting completely through the single polymer film using a laser singulation and releasing by using a laser release of the cells to form the individual microbattery cells.

17. The method of claim 16, wherein the substrate 130 is on a face side of the stack, the substrate on the adhesive layer, wherein there are multiple terminals on the face side and coupled to through-vias that extend through the substrate layer, and the method further comprises cutting openings through the polymer film and through the adhesive layer to uncover at least a portion of corresponding terminals.

18. The method of claim 17, further comprising filling the openings with a conductor.

8. The microbattery of claim 1, wherein the metal-containing film covering the portion of the face side, but not the first or second terminals, covers parts of the first side adjacent the edges.

9. The microbattery of claim 8, wherein the metal-containing film covering the portion of the face side, but not the first or second terminals, is contiguous around corners of the side surfaces from the side surfaces to the parts of the face side that are covered and that are adjacent the edges.

10. The microbattery of claim 1, wherein the metal-containing film covering the at least a portion of the second side adjacent the edges is contiguous around corners of the second side from the side surfaces to the parts of the second side that are covered and that are adjacent the edges.

11. The microbattery of claim 1, wherein the second side has a part, not covered by the metal-containing film, that comprises adhesive.

12. The microbattery of claim 11, herein the metal-containing film covering the portion of the face side, but not the first and second terminals, covers parts of the first side adjacent the edges, wherein the face side has a part, not covered by the metal-containing film, that comprises adhesive and contains the first or second terminals.