

CLAIMS

What is claimed is:

1. An apparatus, comprising:
a substrate including a plurality of probes; and
a hybridization seal, comprising:
an evaporation barrier; and
a layer including walls that form a grid pattern and define a plurality of sample chambers that are to receive fluid, the layer includes a first side removably coupled to the substrate and a second side coupled to the evaporation barrier,
wherein the evaporation barrier includes barrier sections that cover the probes and include one or more channels.
2. The apparatus of claim 1, wherein the evaporation barrier is substantially rigid.
3. The apparatus of any one of the preceding claims, wherein the evaporation barrier comprises polyethylene terephthalate.
4. The apparatus of any one of the preceding claims, wherein the one or more channels are positioned around at least a portion of a perimeter of each of the barrier sections.
5. The apparatus of any one of the preceding claims, wherein the one or more channels are at least substantially parallel or at least substantially perpendicular relative to the walls defining the sample chambers.
6. The apparatus of any one of the preceding claims, wherein the barrier sections have a rectangular shape.
7. The apparatus of any one of the preceding claims, further including a second layer and wherein the evaporation barrier is coupled between the layer and the second layer.
8. The apparatus of claim 7, wherein the layer comprises an adhesive multi-layer and the second layer comprises a barrier layer.
9. The apparatus of any one of the preceding claims, wherein a surface of the evaporation barrier that faces toward the substrate includes at least one of a hydrophilic coating or has hydrophilic properties.
10. The apparatus of any one of the preceding claims, wherein the layer has an end comprises a plurality of intersecting surfaces.
11. The apparatus of claim 10, wherein the intersecting surfaces form a sawtooth profile.
12. The apparatus of claim 11, wherein the sawtooth profile allows the layer to be more easily removed from the substrate.
13. The apparatus of any one of claims 10 – 12, wherein the end of the layer defines a pair of alignment holes.

14. The apparatus of claim 13, wherein a first sawtooth at a first edge of the layer defines one of the alignment holes and a second sawtooth at a second edge of the layer defines a second one of the alignment holes.
15. The apparatus of any one of claims 7 – 14, wherein the layer, the evaporation barrier, and the second layer comprise alignment holes.
16. The apparatus of claim 15, wherein the alignment holes of the layer, the evaporation barrier, and the second layer are concentric.
17. The apparatus of claim 1, wherein a surface of the evaporation barrier that faces toward the substrate includes at least one of a hydrophilic coating or has hydrophilic properties.
18. The apparatus of claim 1, wherein the layer has an end comprises a plurality of intersecting surfaces.
19. An apparatus, comprising:
 - an evaporation barrier; and
 - a layer including walls that form a grid pattern and including a first side and a second side, the second side coupled to the evaporation barrier,
 - wherein the evaporation barrier includes barrier sections that include one or more channels.
20. The apparatus of claim 19, wherein each of the barrier sections includes an inlet opening.
21. The apparatus of claim 20, wherein the second layer includes walls that form a barrier around the corresponding inlet openings.
22. The apparatus of any one of claims 19 – 21, further comprising a frame portion that surrounds at least a portion of the evaporation barrier and further comprising frangible couplings between the frame portion and the evaporation barrier.
23. The apparatus of any one of claims 19 – 22, wherein each of the barrier sections includes corner vents.
24. The apparatus of any one of claims 19 – 23, further including a second layer and wherein the evaporation barrier is coupled between the layer and the second layer.
25. The apparatus of claim 24, wherein the second layer is coupled to the evaporation barrier.
26. The apparatus of any one of claims 19 – 25, wherein the second layer and the evaporation barrier are overmolded.
27. The apparatus of any one of claims 19 – 26, wherein the one or more channels are angled relative to the walls defining the sample chambers.
28. The apparatus of any one of claims 19 – 27, wherein each of the barrier sections includes an inlet opening and the one or more channels are coupled to the inlet opening.

29. The apparatus of claim 28, wherein an end of the one or more channels is semi-circular.
30. The apparatus of any one of claims 19 – 28, wherein the one or more channels are staggered relative to one another.
31. The apparatus of any one of claims 19 – 30, wherein a portion of each of the barrier sections is heat treated.
32. The apparatus of claim 31, wherein the heat treating of the portion of each of the barrier sections enables deformation that allows the barrier sections to have a convex profile or a concave profile depending on an amount of the fluid within the corresponding sample chamber.
33. The apparatus of any one of claims 19 – 32, further comprising a release liner coupled to a first side of the layer.
34. The apparatus of claim 33, further comprising a release liner assembly comprising the release liner and a peel tab coupled to the release liner to enable the release liner to be removed from the layer.
35. The apparatus of claim 34, further comprising a second peel tab, wherein the peel tab is coupled to the release liner adjacent a first end of the release liner and the second peel tab is coupled to the release liner adjacent a second end of the release liner.
36. The apparatus of claim 19, wherein each of the barrier sections includes corner vents.
37. A method, comprising:
dispensing fluid through inlet openings and into sample chambers, where the sample chambers are between a substrate and a hybridization seal, where the substrate includes probes, and where the hybridization seal includes an evaporation barrier having barrier sections that cover the probes; and
flowing the fluid relative to one or more channels of the corresponding barrier sections to disperse the fluid within the corresponding sample chamber.
38. The method of claim 37, wherein the one or more channels are angled relative to the walls defining the sample chambers.
39. The method of any one of claims 37 – 38, wherein the one or more channels are positioned around at least a portion of a perimeter of each of the barrier sections.
40. The method of any one of claims 37 – 39, wherein the one or more channels are at least substantially parallel or at least substantially perpendicular relative to the walls defining the sample chambers.
41. An apparatus, comprising:
a substrate including a plurality of probes; and
a hybridization seal, comprising:

an evaporation barrier; and

a layer including walls that form a grid pattern and define a plurality of sample chambers that are to receive fluid, the layer includes a first side removably coupled to the substrate and a second side coupled to the evaporation barrier,

wherein the evaporation barrier includes barrier sections that cover the probes and include one or more slits that allow the barrier sections to have a convex profile or a concave profile depending on an amount of the fluid within the corresponding sample chamber.

42. The apparatus of claim 41, wherein the one or more slits extend between a perimeter of the barrier sections toward a center of the barrier sections.

43. The apparatus of claim 42, wherein the one or more slits are at least substantially parallel or at least substantially perpendicular relative to the walls defining the sample chambers.

44. The apparatus of any one of claims 42 - 43, wherein the one or more slits are angled relative to the walls defining the sample chambers.

45. The apparatus of any one of claims 41 – 44, wherein the one or more slits are positioned around at least a portion of a perimeter of each of the barrier sections.

46. The apparatus of any one of claims 41 – 45, wherein the one or more slits form barrier sub-sections.

47. The apparatus of claim 46, wherein the barrier sub-sections have a rectangular shape.

48. The apparatus of claim 46, wherein the barrier sub-sections have a triangular shape.

49. The apparatus of any one of claims 41 – 48, wherein a portion of each of the barrier sections is heat treated.

50. The apparatus of any one of claims 41 – 49, wherein each of the barrier sections includes an inlet opening.

51. The apparatus of claim 50, wherein one or more of the inlet openings are located in different positions on one or more of the barrier sections.

52. An apparatus, comprising:

an evaporation barrier; and

a layer carrying the evaporation barrier and including walls that form a grid pattern,

wherein the evaporation barrier includes barrier sections that each includes an inlet opening and one or more slits.

53. The apparatus of claim 52, further comprising a first release liner coupled to a first side of the layer and a second release liner covering the evaporation barrier.

54. The apparatus of claim 53, further comprising adhesive on the first side of the layer between the first release liner and the layer.

55. The apparatus of any one of claims 52 – 54, further including a second layer and wherein the evaporation barrier is coupled between the layer and the second layer.
56. The apparatus of claim 55, wherein the evaporation barrier includes a tab that extends out from between the layer and the second layer.
57. The apparatus of any one of claims 52 – 56, wherein the one or more slits extend between a perimeter of the barrier sections toward a center of the barrier sections.
58. The apparatus of any one of claims 52 – 57, wherein the one or more slits are at least substantially parallel or at least substantially perpendicular relative to the walls.
59. An apparatus, comprising:
a substrate including a plurality of probes; and
a hybridization seal, comprising:
an evaporation barrier including barrier sections that cover the probes and each includes a flap and an inlet opening; and
a layer including walls that form a grid pattern and define a plurality of sample chambers that are to receive fluid, the layer is removably coupled to the substrate and is coupled to the evaporation barrier,
wherein the flaps are selectively actuatable to allow access to the corresponding sample chambers.
60. The apparatus of claim 59, wherein the flap is arc-shaped.
61. The apparatus of any one of claims 59 - 60, wherein the flap is defined by slits through the evaporation barrier.
62. The apparatus of claim 61, wherein the slits at least one of (i) form a cross and (ii) define the inlet opening.
63. The apparatus of any one of claims 59 – 62, wherein one or more of the inlet openings are located in different positions on one or more of the barrier sections.
64. The apparatus of any one of claims 59 – 64, wherein the plurality of probes are coupled to a plurality of beads and the plurality of beads are within each of the sample chambers.
65. A method, comprising:
removing a liner from a hybridization seal; and
coupling the hybridization seal to a substrate including a plurality of probes to form corresponding sample chambers and a microarray assembly, wherein coupling the hybridization seal includes covering the probes with barrier sections of an evaporation barrier of the hybridization seal, each of the barrier sections includes an inlet opening and one or more of the following:

- (i) one or more slits;
- (ii) a flap that is actuatable to allow access through the inlet opening; and
- (iii) one or more channels.

66. The method of claim 65, further comprising dispensing fluid into one of the sample chambers and forming a convex profile or a concave profile with the corresponding barrier section based on an amount of the fluid within the corresponding sample chamber.

67. The method of claim 66, further comprising dynamically adjusting a position of the barrier section relative to the substrate based on the amount of the fluid within the corresponding sample chamber.

68. A method, comprising:

dispensing fluid through inlet openings and into sample chambers, where the sample chambers are between a substrate and a hybridization seal, where the substrate includes probes, and where the hybridization seal includes an evaporation barrier having barrier sections that cover the probes; and

detering evaporation of the fluid within the sample chambers by dynamically adjusting a position of the barrier sections relative to the substrate based on an amount of the fluid within the corresponding sample chambers or by covering at least a portion of the inlet openings using flaps formed by the barrier sections.

69. The method of claim 68, wherein each barrier section includes one or more slits.

70. The method of any one of claims 68 – 69, further comprising forming the flaps using intersecting slits.

71. The method of any one of claims 65 – 67, further comprising forming the flaps using arc-shaped slits.