

- 31.** A microarray apparatus, comprising:
a reaction chamber having an interior cavity;
a target liquid contained within the interior cavity of the reaction chamber;
a volume exclusion liquid contained within the interior cavity; and
an array of probes deposited on an inner surface of the interior cavity of the reaction chamber for reaction with a target molecule in the target liquid.
- 32.** The microarray apparatus of claim 31, wherein said target liquid has a different density than the volume exclusion liquid.
- 33.** The microarray apparatus of claim 31, wherein said target liquid is substantially immiscible with the volume exclusion liquid.
- 34.** The microarray apparatus of claim 31, wherein said target liquid is magnetic.
- 35.** The microarray apparatus of claim 31, wherein said volume exclusion liquid is magnetic.
- 36.** The microarray apparatus of claim 31, wherein said reaction chamber further comprises:
a substrate having the array of probes deposited thereon; and
a cover coupled to the substrate to form the interior cavity of the reaction chamber therebetween.
- 37.** The microarray apparatus of claim 36, further comprising:
a sealing layer coupled between the substrate and the cover, said sealing layer defining an aperture such that the cover, the aperture in the sealing layer, and the substrate form the interior cavity of the reaction chamber.
- 38.** The microarray apparatus of claim 31, further comprising an agitator for agitating the reaction chamber to cause the target liquid and the volume exclusion liquid to move relative to the array of probes.
- 39.** The microarray apparatus of claim 38, wherein said agitator comprises a centrifuge.
- 40.** A microarray apparatus, comprising:
a reaction chamber having an interior cavity;
an array of probes deposited on an inner surface of the interior cavity for reaction with a target molecule in a target liquid; and
a transducer for directing acoustic waves into the interior cavity of the reaction chamber.
- 41.** The microarray apparatus of claim 40, wherein said transducer generates ultrasonic waves.
- 42.** The microarray apparatus of claim 40, wherein said reaction chamber comprises:
a substrate having the array of probes deposited thereon; and
a cover coupled to the substrate to form the interior cavity of the reaction chamber therebetween.
- 43.** The microarray apparatus of claim 42, further comprising:
a sealing layer coupled between the substrate and the cover, said sealing layer defining an aperture such that the cover, the aperture in the sealing layer, and the substrate form the interior cavity of the reaction chamber.
- 44.** A microarray apparatus, comprising:
a reaction chamber having an interior cavity;
an array of probes deposited on an inner surface of the interior cavity for reaction with a charged target molecule in a target liquid; and
a voltage generator for generating a voltage across the interior cavity to move the charged target molecule.
- 45.** The microarray apparatus of claim 44, wherein said voltage generator comprises a plurality of electrical leads positioned around the interior cavity of the reaction chamber.
- 46.** The microarray apparatus of claim 45, wherein said plurality of electrical leads extend into the interior cavity of the reaction chamber.
- 47.** The microarray apparatus of claim 44, wherein said reaction chamber further comprises:
a substrate having the array of probes deposited thereon; and
a cover coupled to the substrate to form the interior cavity of the reaction chamber therebetween.
- 48.** The microarray apparatus of claim 47, further comprising:
a sealing layer coupled between the substrate and the cover, said sealing layer defining an aperture such that the cover, the aperture in the sealing layer, and the substrate form the interior cavity of the reaction chamber.
- 49.** The microarray apparatus of claim 44, wherein:
said voltage generator is configured to reverse the voltage across the interior cavity according to a predetermined pattern.
- 50.** The microarray apparatus of claim 44, further comprising:
a magnetic field generator for generating a magnetic field across the interior cavity of the reaction chamber in a first direction;
wherein said voltage generator is configured to generate an electric field across the interior cavity of the reaction chamber in a second direction, said second direction being non-parallel with the first direction.
- 51.** A microarray apparatus, comprising:
a reaction chamber having an interior cavity;
an array of probes deposited on an inner surface of the interior cavity for reaction with a charged target molecule in a target liquid; and
a temperature control mechanism for generating a temperature gradient across the interior cavity of the reaction chamber.
- 52.** The microarray apparatus of claim 51, wherein:
said temperature control mechanism comprises a heat pump for heating a first portion of the interior cavity and cooling a second portion of the interior cavity.