between the fluid paths and also may be less likely to bias diffusion in a particular direction, where such a bias is undesired.

[0064] Fluid paths **20, 30** may have a cross-section of any shape suitable for use with the desired fluid or fluids. For example, the cross-section of fluid paths **20, 30** may be polygonal, ovoid or of odd or irregular shape. The shape of fluid paths **20, 30** may influence the shape and size of contact region **40** and may be selected to provide a desired level of contact, and thus diffusion, between fluid paths **20, 30**. For example, where it is desired to increase the area through which materials from fluid paths **20, 30** may diffuse, the size of contact region **40** may be maximized by altering the geometry of fluid paths **20, 30**. For example, the cross-section of fluid paths **20, 30** may be flat on the side of each fluid path **20, 30** facing contact region **40**. Alternatively, fluid paths **20, 30** may have corresponding structure that increases the surface area of contact region **40**. For example, one fluid path **20** may have concave structure and the other fluid path **30** may have corresponding convex structure. In some embodiments, only small amounts of diffusion between fluid paths **20, 30** may be desired. In embodiments where only small amounts of diffusion between fluid paths **20, 30** is desired, the surface area of contact region **40** may be decreased accordingly. For example, fluid paths **20, 30** may have a taper toward contact region **40**, such that the size of contact region **40** is reduced. The construction of convection controller **50** may also be modified to increase or decrease the amount of diffusion between fluid paths **20, 30**, as described in greater detail below.

[0065] Fluids paths **20, 30** may include inlets **22, 32**. Inlets **22, 32** may be constructed in any manner that allows fluid to be introduced into fluid paths **20, 30**. For example, inlets **22, 32** may be constructed as injection ports, slits, funnels, other openings, or a combination of opening types. Inlets **22, 32** may be adapted to mate with an additional fluid path, pump, syringe, inkjet printing apparatus, robotic dispenser, or other device to facilitate the introduction of fluid into fluid paths **20, 30**.

[0066] Fluid paths **20, 30** may be oriented with respect to one another in any manner that produces the desired number of contact regions **40**. For example, fluid paths **20, 30** may overlap one another such that they are separated from one another only by convection controller **50**. Such an arrangement may be referred to as tangentially intersecting fluid paths. Crossing angles between fluid paths **20, 30** may be any angle producing the desired contact region **40**. For example, the crossing angle may be from about 5 to 175 degrees, about 25 to 155 degrees, about 45 to 135 degrees, about 60 to 120 degrees, or about 90 degrees. In some embodiments, fluid paths **20, 30** may have more than one contact region **40** between a single pair of fluid paths **20, 30**. For example, fluid paths **20, 30** may be curved or zigzag in shape. An arrangement where there are multiple contact regions between two fluid paths may be of particular interest where it is desired to react constituents within fluid path **20** and to monitor the progress of the reaction with an indicator in fluid path **30**. In such an embodiment, fluid path **20** may weave back and forth across fluid path **30**.

[0067] In some embodiments, fluid paths **20, 30** may cross one another without having a contact region. For example, a substantially fluid impermeable barrier may be placed between fluid paths **20, 30**, or fluid paths **20, 30** may be displaced from one another in a plane perpendicular to their general orientation. It should be appreciated that fluid paths **20, 30** need not have a plane of general orientation in all embodiments. For example, fluid paths **20, 30** may be constructed in three dimensions and may overlap or twist about one another, creating as many or as few contact regions **40** as desired.

[0068] In embodiments where more than two fluid paths **20, 30** are used, the fluid paths may be arranged in any manner that two fluid paths may be arranged and may further include fluid paths having a contact region with more than one other fluid path. In some embodiments, the arrangement of the fluid paths may be as straightforward as possible. For example, the fluid paths may be arranged in simple geometries, such as linear fluid paths having common crossing angles. In one embodiment, the fluid paths are arranged in two overlapping sets of fluid paths **20, 30**. Such sets may have any number of fluid paths in each set. Where it is desired to achieve the maximum number of contact regions **40**, the number of fluid paths in each of two sets may be equal. In order to even further increase the number of contact regions **40**, a third set of fluid paths may be placed along a third axis. In one embodiment, multiple fluid paths may be arranged in parallel sets in three axes, such as a $10\times10\times10$ fluid path array arranged in three orthogonal axes.

[0069] Fluid paths **20, 30** may be constructed of any material(s) that will not adversely affect or be affected by fluid flowing through fluid paths **20, 30**. For example, fluid paths **20, 30** may be constructed of a material that is chemically inert in the presence of a fluid or fluids to be used within fluid paths **20, 30**. Preferably, fluid paths **20, 30** are constructed of a single material that is cheap, durable and easy to work with, facilitating use outside a laboratory setting and making disposal cost effective. For example, fluid paths **20, 30** may be constructed of a polymeric material. It should be appreciated that the fluid paths may have some degree of reaction or other interaction with the fluid to be used therein, so long as the results do not interfere with the ability of the overall fluidic system to function as desired. For example, in some instances, organic solvents may be used in fluid paths constructed of polymeric materials that absorb and/or expand in their presence. This type of reaction may be acceptable depending on the application and degree of expansion.

[0070] Where fluid paths **20, 30** are constructed of a polymer, the polymer may be selected based on its compatibility with the fluids to be used, its durability and shelf life, its cost and its ease of use. Preferably, fluid paths **20, 30** are constructed from an elastomeric polymer such as polymers of the general classes of silicone polymers, epoxy polymers and acrylic polymers. A particularly preferred polymer is poly(dimethylsiloxane) ("PDMS"). PDMS is a relatively inexpensive, durable, elastomeric polymer. Because PDMS is stable, fluid paths **20, 30** and other portions of microfluidic systems constructed of PDMS may have a shelf life of 6 months or more. PDMS is transparent, facilitating direct observation of visually perceptible interactions. PDMS is also relatively easy to work with. It should be understood that while polymeric materials, and particularly PDMS, are preferred for the construction of fluid paths **20, 30**, other