53. A method for dispersing a material in a fluid comprising:

providing an article having a channel designed to have fluid flow therethrough in a principal direction, the channel including a channel surface having at least one groove or protrusion therein that traverses at least a portion of the channel surface, at least one groove or protrusion oriented at an angle relative to the principal direction; and

causing the fluid in the channel to flow laminarly along the principal direction.

54. The method of claim 53, wherein the fluid flowing in the channel has a Reynolds number that is less than about 100.

55. The method of claim 54, wherein the fluid flowing in the channel has a Reynolds number that is less than about 10.

56. The method of claim 55, wherein the fluid flowing in the channel has a Reynolds number that is less than about 5.

57. The method of claim 53, wherein the step of causing the fluid to flow in the channel results in a fluid residence time in the channel of less than about 20 seconds.

58. A method comprising:

causing a first fluid to flow in a channel at a Reynolds number that is less than about 100;

causing a second fluid to flow in the channel at a Reynolds number that is less than about 100; and

creating a transverse flow component in the first and the second fluids to promote mixing between the first and second fluids.

59. The method of claim 58, wherein the channel has a width that is less than about 1000 μm.

60. The method of claim 59, wherein the step of creating a transverse flow component creates at least one helical flow path.

61. The method of claim 58, wherein the second fluid has a Reynolds number that is about equal to the Reynolds number of the first fluid.

62. The method of claim 61, wherein the first fluid has a composition that differs from a composition of the second fluid.

63. A method for forming a microfluidic article comprising:

forming a first topological feature that has a smallest dimension that is less than about 1000 μm on a surface of a mold substrate;

forming a second topological feature on the first topological feature to form a mold master, the second topological feature characterized by a length that traverses at least a portion of a section of the first topological feature;

placing a hardenable material on the surface;

hardening the material thereby creating a molded article having a microfluidic channel shaped from the first topological feature and at least one groove or protrusion shaped from the second topological feature; and

removing the microfluidic article from the mold master.

64. The method of claim 63, wherein the hardenable material comprises a cross-linkable polymer.

65. The method of claim 64, wherein the step of hardening the material comprises applying heat to the material.

66. The method of claim 65, wherein the groove or protrusion has a depth that is less than a width of the first topological feature.

67. A method for producing a helical flow path in a fluid flowing along a principal direction comprising:

providing a structure having a surface with a plurality of substantially linear grooves or protrusions oriented at an angle relative to the principal direction, the grooves or protrusions formed to be parallel to and periodically spaced from each other; and

causing the fluid to flow along the surface, the fluid flowing adjacent the surface having a Reynolds number that is less than about 100.

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