

5. The valve of claim 1, wherein the passage further comprises a second surface disposed at a second angle to the central axis, and wherein at least a second portion of the TRS that obstructs the passage abuts the second surface.

6. The valve of claim 5, wherein the first and second surfaces protrude into the passage.

7. The valve of claim 5, wherein the first and second surfaces form a restriction therebetween.

8. A method for producing a valve for a microfluidic system, comprising:

providing a substrate defining a passage that joins an upstream and a downstream channel of the microfluidic system, the passage comprising a retaining surface; and

introducing a mass of temperature responsive material (TRS) into the passage, wherein, when the valve is in the closed state, pressure in the upstream channel urges the TRS against the retaining surface.

9. A method for producing a valve for a microfluidic system, comprising:

providing a substrate defining a passage that joins an upstream and a downstream channel of the microfluidic system; and

introducing a mass of temperature responsive material (TRS) into a reservoir channel adjacent the passage, wherein capillary action draws the TRS into the passage, and wherein a surface tension of the TRS substantially prevents the TRS in the passage from entering the upstream or downstream channel.

10. A valve for providing a passage between an upstream and a downstream channel of a microfluidic system, the valve comprising:

a temperature responsive substance (TRS), wherein, at a first temperature, the TRS is disposed to obstruct the passage, and wherein, at a second temperature, at least a portion of the (TRS) enters the downstream channel, thereby opening the passage.

11. The valve of claim 10, wherein at least about 75% of the TRS that obstructs the passage enters the downstream channel upon the opening of the passage.

12. A valve for providing a passage between upstream and downstream channels of a microfluidic system, comprising:

a temperature responsive substance (TRS) configured to substantially obstruct the passage;

a heat source disposed in thermal contact with the (TRS), wherein, upon actuation of the heat source, at least a portion of the (TRS) enters the downstream channel, thereby opening the passage.

13. The valve of claim 12, wherein the passage comprises a first surface, wherein pressure present in the upstream channel urges at least a portion of the TRS against the first surface.

14. The valve of claim 13, wherein the passage further comprises a second surface, wherein pressure present in the upstream channel urges at least a portion of the TRS against the second surface.

15. The valve of claim 14, wherein the first and second opposed walls define a restriction therebetween.

16. The valve of claim 12, wherein the heat source is configured to heat at least a portion of the downstream

channel to substantially prevent (TRS) that enters the downstream channel from obstructing the channel.

17. A microfluidic system, comprising:

a substrate defining a processing chamber, a source channel, and a downstream channel, the source channel joining the processing chamber at a first point and the downstream channel joining the processing chamber at a second point;

a thermally responsive substance (TRS) disposed to obstruct a passage between the processing chamber and downstream channel; and

a heat source in thermal contact with the TRS, wherein, upon actuation of the heat source, at least a portion of the TRS enters the downstream channel, thereby opening the passage.

18. A valve for use in a microfluidic system, comprising:

a substrate defining an upstream channel and a downstream channel joined by a passage;

a thermally responsive substance (TRS) disposed to substantially obstruct the passage, wherein a length of the TRS obstructing the passage is greater than a width of the upstream channel adjacent the passage; and

a heat source in thermal contact with the TRS, wherein, upon actuation of the heat source, an opening motion of the TRS opens the passage.

19. The valve of claim 18, further comprising a reservoir of TRS adjacent the passage, wherein a width of the reservoir is greater than the width of the upstream channel.

20. The valve of claim 19, wherein the opening motion comprises a retraction of the TRS into the reservoir.

21. The valve of claim 18, wherein the passage comprises a surface and pressure present in the upstream channel urges at least a portion of the TRS against the surface.

22. A valve for use in a microfluidic system, comprising:

a substrate defining a first and second channel joined by a passage, the first channel and the passage defining an opening therebetween;

a thermally responsive substance (TRS) disposed to substantially obstruct the passage, wherein a height of the opening is less than a height of the first channel adjacent the opening such that capillary action draws TRS into the passage and a surface tension of the TRS substantially prevents the TRS from entering the first or second channel; and

a heat source in thermal contact with the TRS, wherein, upon actuation of the heat source, an opening motion of the TRS opens the passage.

23. The valve of claim 22, wherein the second channel and the passage define an second opening therebetween, and further wherein a height of the second opening is less than a height of the second channel adjacent the passage.

24. The valve of claim 23, wherein the heights of each of the first and second openings are at least about 50% less than the corresponding heights of the first and second channels, respectively.

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