inlet **2** and the titrant Cr(VI) into inlet **346**. **FIG. 32** shows the curves obtained for various concentrations of Fe(II) and Cr(VI) and Table 1B compares these values with ones predicted by calculations. One advantage of using this configuration is a lower detection limit of ~1 mM for Fe(II), a value sometimes reported for conventional potentiometric titrations. This device was also evaluated for the titration of I^- with $S_2O_8^{2-}$ and a similar agreement between the experimental and theoretical titration end-points was found.

[0164] The present accuracy of this device was determined to be ±1 channel. The shift of the titration end-point of one channel corresponds to a variation of the sample concentration by a factor of ~3-5 fold (since a 10-fold change in the concentration of the starting sample resulted in a shift of end-point between 2-3 channels, Table 1).

TABLE 1

Comparison between the titration end-point determined by experiments (exper. end-point) and by calculations (theor. end-point).

	[Fe(II)] (mM)	[Cr(VI)] (mM)	Theor. end-point: Channel Number	Exper. end-point[a]: Channel Number
A.	100	0.05	10	9
	100	0.5	7	7
	100	50	2	3
B.	10	50	6	5
	10	5	4	3
	1	5	6	5

[a]denotes an average of 3 experimental measurements (±1 channel)
A. Solution of Fe(II) injected into inlet 344 and Cr(VI) into inlet 346.
B. Solution of Cr(VI) injected into inlet 344 and Fe(II) into inlet 346.

[0165] It will be understood that each of the elements described herein, or two or more together, may be modified or may also find utility in other applications differing from those described above. While particular embodiments of the invention have been illustrated and described, the present invention is not intended to be limited to the details shown, since various modifications and substitutions may be made without departing in any way from the spirit of the present invention as defined by the following claims.

1. A microfluidic system, comprising:

a first fluid path;

a second fluid path segregated from the first fluid path by a first convection controller at a first contact region;

wherein at least one of the first fluid path and the second fluid path has a cross-sectional dimension of less than about 1 mm.

2. The microfluidic system of claim 1, wherein the first fluid path and the second fluid path are substantially tangentially intersecting at the first contact region.

3. The microfluidic system of claim 1, wherein at least one of the first fluid path and the second fluid path is substantially rectangular in cross-section at the first contact region.

4. The microfluidic system of claim 1, wherein the first fluid path and the second fluid path have a crossing angle between about 45 and 135 degrees.

5. The microfluidic system of claim 4, wherein the first fluid path and the second fluid path have a crossing angle of about 90 degrees.

6. The microfluidic system of claim 1, wherein the convection controller is permeable by diffusion.

7. The microfluidic system of claim 6, wherein the convection controller has an affinity for at least one material to be used within the microfluidic system and repulses at least one material to be used within the microfluidic system.

8. The microfluidic system of claim 7, wherein the convection controller carries an electrical charge.

9. The microfluidic system of claim 6, wherein the convection controller comprises pores about 0.05 to 0.2 micrometers in average diameter.

10. The microfluidic system of claim 9, wherein the inhibitor comprises pores about 0.1 micrometers in diameter.

11. The microfluidic system of claim 6, wherein the convection controller comprises a portion about 5 to 50 microns thick.

12. The microfluidic system of claim 11, wherein the convection controller comprises a portion about 10 microns thick.

13. The microfluidic system of claim 6, wherein the convection controller comprises a membrane.

14. The microfluidic system of claim 13, wherein the membrane comprises polycarbonate.

15. The microfluidic system of claim 1, further comprising an interaction material positioned within one of the first fluid path and the second fluid path.

16. The microfluidic system of claim 15, wherein the interaction material is one of a test fluid and an indicator.

17. The microfluidic system of claim 15, wherein the interaction material is immobilized within the one of the first fluid path and the second fluid path.

18. The microfluidic system of claim 1, wherein the convection controller comprises:

a first membrane; and

a second membrane in spaced relation to the first membrane.

19. The microfluidic system of claim 18, wherein the first membrane and the second membrane are no more than 500 micrometers apart.

20. The microfluidic system of claim 19, wherein the first membrane and the second membrane are no more than 250 micrometers apart.

21. The microfluidic system of claim 20, wherein the first membrane and the second membrane are no more than 100 micrometers apart.

22. The microfluidic system of claim 1, further comprising:

a third fluid path segregated from the second fluid path by a second convection controller at a second contact region; and

a fourth fluid path segregated from the first fluid path by a third convection controller at a third contact region and segregated from the third fluid path by a fourth convection controller at a fourth contact region.

23. The microfluidic system of claim 22, wherein the first convection controller, the second convection controller, the third convection controller and the fourth convection controller comprise a single convection controller.

24. The microfluidic system of claim 22, wherein at least one of the first fluid path and the second fluid path comprises a cross-sectional dimension of less than about 300 μm.

25. The microfluidic system of claim 24, wherein at least one of the first fluid path and the second fluid path comprises a cross-sectional dimension of less than about 100 μm.