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examples of multiple fluid systems include sample stacking, field amplified injection, isotachopheresis, and sweeping.

Further, the present temperature gradient focusing provides enhanced concentration when compared with the prior art of other single preconcentration methods.

Although the invention has been described above in relation to preferred embodiments thereof, it will be understood by those skilled in the art that variations and modifications can be effected in these preferred embodiments without departing from the scope and spirit of the invention.

What is claimed is:

1. A method for directing one or more materials in a fluid, said method comprising the steps of:

applying an electric field to a fluid thereby causing one or more materials to move electrophoretically;

establishing a temperature gradient in said fluid thereby generating a gradient of the electrophoretic velocity of said one or more materials;

producing a flow of said fluid thereby changing the total velocity of said one or more materials; and

adding an additive to said fluid thereby modifying the normal electrophoretic velocity of said one or more materials based on an interaction of said one or more materials with said additive.

2. The method of claim 1, wherein:

said temperature gradient has a significant component substantially aligned with the electrophoretic motion of said one or more materials,

said flow of said fluid has a significant component substantially aligned in a direction opposite a direction of said electrophoretic motion of said one or more materials, and

adjusting magnitudes of said electric field, said temperature gradient, and said flow so that at least one of said one or more materials will accumulate or be focused at at least one position along said temperature gradient, the pH at said at least one position being unequal to the isoelectric point of said at least one of said one or more materials that are focused at said at least one position; whereby said step of adding an additive causes a change in the focusing position of at least one of said one or more materials.

3. The method of claim 2, wherein the pH of said fluid is temperature dependent and said temperature gradient establishes a gradient in the pH of said fluid.

4. The method of claim 2, wherein the ionic strength of said fluid is temperature dependent and said temperature gradient establishes a gradient in the ionic strength of said fluid.

5. The method of claim 4, wherein at least two of said one or more materials being initially spatially mixed within said fluid are separated.

6. The method of claim 4, wherein said one or more materials are selected from the group consisting of fluorescent dyes, ions, amino acids, peptides, proteins, nucleic acids, cells, and colloidal particles.

7. The method of claim 4, wherein said fluid is selected from the group consisting of ionic aqueous solutions, ionic non-aqueous solutions, aqueous buffer solutions, and mixtures of aqueous and non-aqueous solutions.

8. The method of claim 4, wherein said electric field is applied using a set of components comprising an electrical power supply and two or more electrodes contacting said fluid.

9. The method of claim 4, wherein the temperature gradient is one of linear and non-linear.

10. The method of claim 4, wherein the temperature gradient is one of monotonic and non-monotonic.

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11. The method of claim 4, wherein said step of establishing a temperature gradient comprises applying an electric current to the fluid to produce the temperature gradient by Joule heating.

12. The method of claim 4, wherein said step of establishing a temperature gradient comprises supplying thermal energy to said fluid via a heated block.

13. The method of claim 4, wherein said step of establishing a temperature gradient comprises removing thermal energy from said fluid via a cooled block.

14. The method of claim 4, wherein said flow is generated by electroosmosis.

15. The method of claim 4, wherein said flow is generated by pressure gradients.

16. The method of claim 4, wherein said flow is generated by a combination of electroosmosis and pressure gradients.

17. The method of claim 4, wherein said additive comprises a chiral selector.

18. The method of claim 17, wherein said chiral selector is selected from the group consisting of alpha-cyclodextrin, beta-cyclodextrin, gamma-cyclodextrin, heptakis-O-methyl beta-cyclodextrin, heptakis(2,6-di-O-methyl) beta-cyclodextrin, heptakis(2,3,6-tri-O-methyl) beta-cyclodextrin, hydroxyethyl beta-cyclodextrin, hydroxypropyl beta-cyclodextrin, sulfated beta-cyclodextrin, 6-O-alpha-D-glucosyl-alpha-cyclodextrin, 6-O-alpha-D-glucosyl-beta-cyclodextrin, 2-hydroxy-3-trimethylammonioethyl-beta-cyclodextrin, carboxymethyl beta-cyclodextrin, carboxyethyl beta-cyclodextrin, sulfobutyl beta-cyclodextrin, vancomycin, heparin, maltooligosaccharides, dextrin, teicoplanin, and deoxy Big CHAP.

19. The method of claim 4, wherein said additive comprises a nonionic additive.

20. The method of claim 4, wherein said additive does not form a pseudostationary phase.

21. The method of claim 4, wherein said additive forms a pseudostationary phase.

22. The method of claim 21, wherein said pseudostationary phase is selected from the group consisting of micelles, microemulsion droplets, liposomes, particles and dendrimers.

23. The method of claim 21, wherein said additive is selected from the group consisting of anionic surfactants, cationic surfactants, and nonionic surfactants.

24. The method of claim 4, wherein the interaction of a first stereoisomer of one of said one or more materials with said additive is stronger than the interaction of a second stereoisomer of said one of said one or more materials with said additive, thereby allowing the separation of said first stereoisomer from said second stereoisomer.

25. The method of claim 4, wherein said step of applying an electric field, said step of establishing a temperature gradient, and said step of producing a bulk flow comprise using an electrical power supply to apply a voltage to said fluid, and wherein the electric field provided by said electrical power supply causes the electrophoretic motion of said one or more materials, a flow of electric current in said fluid thereby generating said temperature gradient by Joule heating, and electroosmosis of said fluid thereby producing said flow of said fluid.

26. The method of claim 4, wherein said step of applying an electric field and said step of producing a bulk flow comprise using an electrical power supply to apply a voltage to said fluid, and wherein the electric field provided by said electrical power supply causes the electrophoretic motion of said one or more materials, and electroosmosis of said fluid thereby producing said flow of said fluid.