microchannel) connected to the high voltage supply in series with the microchannel. For pressure driven flow studies, a programmable syringe pump (Harvard Apparatus PHD 2000, Holliston, Mass.) was interfaced to the stainless tubing in the inlet reservoirs via Teflon tubing.

[0084] The foregoing description of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed, and other modifications and variations may be possible in light of the above teachings. The embodiment was chosen and described in order to best explain the principles of the invention and its practical application to thereby enable others skilled in the art to best utilize the invention in various embodiments and various modifications as are suited to the particular use contemplated. It is intended that the appended claims be construed to include other alternative embodiments of the invention except insofar as limited by the prior art.

What is claimed is:

1. A mixer of laminar microfluidic streams propelled by electrokinetic flow comprising:

a first inlet channel;

a second inlet channel;

a mixing channel starting at the confluence of said first inlet channel and said second inlet channel; and

a plurality of substantially straight unconnected wells disposed in said mixing channel, said wells being obliquely oriented substantially across the width of said mixing channel, said wells being greater in depth than in width, said wells having well surfaces that increase electroosmotic mobility more than other surfaces of said mixing channel.

2. The mixer of claim **1** wherein alternating wells are configured perpendicular to each other.

3. The mixer of claim **1** wherein said wells are configured parallel to each other.

4. A splitter of a substantially laminar microfluidic stream comprising:

a splitting channel coupled to at least two inlet ports and at least one outlet port in which said substantially laminar microfluidic stream has an axis of flow; and

a plurality of substantially straight unconnected wells disposed in said splitting channel, said wells being oriented substantially across the width of said channel and diagonal to said axis of flow, said wells being greater in depth than in width, said wells having well surfaces that increase electroosmotic mobility more than other surfaces of said splitting channel.

5. The splitter of claim **5** wherein alternating wells are configured perpendicular to each other.

6. The splitter of claim **5** wherein said wells are configured parallel to each other.

7. The splitter of claim **5** wherein said microfluidic streams are propelled by pressure.

8. The splitter of claim **5** wherein said microfluidic streams are propelled by electroosmosis.

9. The splitter of claim **5** wherein said microfluidic streams are propelled by electrokinetics.

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