parallel with the analyte concentrator. The shunt resistor does not limit the degree of concentration of a trace analyte.

For a very small sample volume, concentrating the one or more analyte species does not result in a increase in channel resistances so significant as to seriously degrade performance when the shunt resistor is provided. However, if the sample volume is comparatively large, after concentration each band of concentrated analyte species has a significant longitudinal extent, and a longer current path through the shunt resistor results. This does effect the channel current and limits performance. Therefore small sample volumes are preferred.

Throughout the system **29**, when electrodes are present in the channel there is a possibility that a discontinuity in the electric field intensity will result. One way this can be mitigated is to form the electrodes from a resistive material so that the resistance of the electrode material matches that of the electrolyte solution. The electrode in each case is connected so that voltage drop across it is minimized. For example a line source electrode extending across the channel **32** such as electrodes **174**, **176** of the analyte concentrator or the steering valve (**144**, **146**, **148**, **150** or **152** in FIG. **13**) is connected at each end on opposite sides of the channel in one embodiment. In another embodiment an electrode can comprise two layers, one layer in contact with the channel being formed of a resistive material matching the resistance of the electrolyte, the other layer (being shielded from the electrolyte) can be conductive. In the later embodiment the electrode is brought to the same potential along its entire length.

Another comment pertaining to the system **29** as a whole is that it enables movement of analyte species around the system, through channel intersections, etc. by precise manipulation of EOF-induced bulk flow in channels. This has implications beyond the system disclosed. Miniaturization of the elements discussed can enable such manipulations in "lab-on-a-chip" applications for example to move substances from one point to another, mix them at a desired point, etc.

With reference again to FIGS. **3**, **7** and **11**, it will be appreciated that the forgoing discussion sets forth an integrated system for separations which can all be incorporated in the monolith **30** construction given as an example. Implications for improved separations and enablement of heretofore untried diagnostic procedures will be apparent to those skilled in the art. While particular forms of the invention have been illustrated and described, it will also be apparent that various modifications can be made without departing from the spirit and scope of the invention.

What is claimed is:

1. A liquid-phase electromobility focusing separation system configured to separate at least one discrete analyte species from an analyte sample, comprising:

a first separation channel defined by a confinement enclosing an interior channel volume, said first separation channel having first and second ends and a longitudinal axis, and said first separation channel being configured to contain an electrolyte solution within the interior channel volume, said separation channel providing the only flowpath for both the analyte sample and the electrolyte solution;

a continuous electric field intensity gradient generator configured to apply a electric field intensity gradient within the first separation channel along the longitudinal axis over at least a portion of the first separation channel intermediate the first and second ends, the intensity of electric field generated varying as a continuous function of location along the longitudinal axis, whereby electrophoretic migration of an analyte species within the first separation channel is actuated by a force that varies with position along the longitudinal axis as a continuous function of position along the longitudinal axis within said portion of the first separation channel;

an electroosmotic flow generator configured to generate an electroosmotic flow along the longitudinal axis of the first separation channel, which electroosmotic flow is variable as to at least one of: (i) the magnitude of the flow, and (ii) the direction of the flow, to enhance separation of said at least one analyte species by enabling separation control of an interaction of forces it created by the continuous electric field intensity gradient generator and the electroosmotic flow generator.

2. A system as in claim **1**, wherein the electroosmotic flow generator comprises a power supply and a distributed source of potential positioned adjacent said containment, whereby zeta potential of an interior surface in fluid contact with the first separation channel can be altered by at least one of:

a) applying a potential, and

b) altering at least one of (i) the magnitude, and (ii) polarity, of potential applied, to the distributed source of potential from the power supply.

3. A system as in claim **2**, wherein the continuous electric field intensity gradient generator comprises a continuously varying resistor comprising a contour resistor in fluid communication with the first separation channel along at least a portion of the longitudinal axis intermediate the first and second ends, said resistor having a resistance that varies as a continuous function of position along the longitudinal axis of the first separation channel, whereby an electrical potential in the electrolyte fluid varies as a non-linear continuous function of position along the longitudinal axis of the first separation channel and, as a result, the electric field intensity varies as a continuous function of position along the longitudinal axis over at least a portion of the first separation channel intermediate the first and second ends.

4. A system as in claim **3**, wherein the continuously varying resistor comprises a filament within the first separation channel.

5. A system as in claim **3**, wherein the continuously varying resistor comprises a packing within the first separation channel that varies in resistivity as a continuous function of position along the longitudinal axis.

6. A system as in claim **3**, wherein said contour resistor comprises a conductive material having a cross sectional shape which varies as a continuous function of position along the longitudinal axis.

7. A system as in claim **3**, wherein said contour resistor has a material property that varies as a continuous function of position along said longitudinal axis.

8. A system as in claim **1**, wherein the continuous electric field intensity gradient generator further comprises:

a cathode positioned adjacent one of the first and second ends of the first separation channel;

an anode positioned adjacent the other of the first and second ends of the first separation channel;

a power supply in electric communication with the cathode and the anode;

a continuously varying resistor in fluid communication with the first separation channel along at least a portion of the longitudinal axis intermediate the first and second ends said resistor having a distance that varies as