Figure 30-2  Charge distribution at a silica/capillary interface and resulting electroosmotic flow.  (From A. G. Ewing, R. A. Wallingford, and T. M. Olefirowicz, Anal. Chem., 1989, 61, 294A. With permission.)
Figure 30-3 Flow profiles for liquids under (a) electroosmotic pressure and (b) hydrodynamic pressure.
Figure 30-4  Velocities in the presence of electroosmotic flow. The length of the arrow next to an ion indicates the magnitude of its velocity; the direction of the arrow indicates the direction of motion. The negative electrode would be to the right, and the positive electrode to the left of this section of solution.
<table>
<thead>
<tr>
<th>Detection Principle</th>
<th>Representative Detection Limit(^b) (moles detected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectrometry</td>
<td></td>
</tr>
<tr>
<td>Absorption(^c)</td>
<td>(10^{-15}-10^{-13})</td>
</tr>
<tr>
<td>Fluorescence</td>
<td></td>
</tr>
<tr>
<td>Precolumn derivatization</td>
<td>(10^{-17}-10^{-20})</td>
</tr>
<tr>
<td>On-column derivatization</td>
<td>(8 \times 10^{-16})</td>
</tr>
<tr>
<td>Postcolumn derivatization</td>
<td>(2 \times 10^{-17})</td>
</tr>
<tr>
<td>Indirect fluorescence</td>
<td>(5 \times 10^{-17})</td>
</tr>
<tr>
<td>Thermal lens(^c)</td>
<td>(4 \times 10^{-17})</td>
</tr>
<tr>
<td>Raman(^c)</td>
<td>(2 \times 10^{-15})</td>
</tr>
<tr>
<td>Mass spectrometry</td>
<td>(1 \times 10^{-17})</td>
</tr>
<tr>
<td>Electrochemical</td>
<td></td>
</tr>
<tr>
<td>Conductivity(^c)</td>
<td>(1 \times 10^{-16})</td>
</tr>
<tr>
<td>Potentiometry</td>
<td>Not reported</td>
</tr>
<tr>
<td>Amperometry</td>
<td>(7 \times 10^{-19})</td>
</tr>
<tr>
<td>Radiometry(^c)</td>
<td>(1 \times 10^{-19})</td>
</tr>
</tbody>
</table>


\(^b\)Detection limits quoted have been determined with a wide variety of injection volumes that range from 18 pl to 10 nL.

\(^c\)Mass detection limit converted from concentration detection limit using a 1-nL injection volume.
Figure 30-5 Three types of cells for improving the sensitivity of detection by absorbance measurements: (a) the 3-mm z cell, (b) the 150-μm bubble cell, (c) the multireflection cell.
Figure 30-6  Electropherogram of a six-anion mixture by indirect detection with 4-nM chromate ion at 254 nm. Peak: (1) bromide (4 ppm), (2) chloride (2 ppm), (3) sulfate (4 ppm), (4) nitrate (4 ppm), (5) fluoride (1 ppm), (6) phosphate (6 ppm).
**Figure 30-10** Electropherogram showing the separation of 30 anions. Capillary internal diameter: 50 μm (fused silica). Detection: indirect UV, 254 nm. Peaks: 1 = thiosulfate (4 ppm), 2 = bromide (4 ppm), 3 = chloride (2 ppm), 4 = sulfate (4 ppm), 5 = nitrite (4 ppm), 6 = nitrate (4 ppm), 7 = molybdate (10 ppm), 8 = azide (4 ppm), 9 = tungstate (10 ppm), 10 = mono-/di-/trisulfate (4 ppm), 11 = chlorate (4 ppm), 12 = citrate (2 ppm), 13 = fluoride (1 ppm), 14 = formate (2 ppm), 15 = phosphate (4 ppm), 16 = phosphite (4 ppm), 17 = chlorite (4 ppm), 18 = galactaric (5 ppm), 19 = carbonate (4 ppm), 20 = acetate (4 ppm), 21 = ethanesulfonate (4 ppm), 22 = propionate (5 ppm), 23 = propanesulfonate (4 ppm), 24 = butyrate (5 ppm), 25 = butanesulfonate (4 ppm), 26 = valerate (5 ppm), 27 = benzoate (4 ppm), 28 = l-glutamate (5 ppm), 29 = pentanesulfonate (4 ppm), 30 = d-gluconate (5 ppm). (From W. A. Jones and P. Jandik. J. Chromatogr., 1991, 546, 445. With permission.)

**Figure 30-11** Separation of alkali, alkaline earths, and lanthanides. Capillary: 36.5 cm × 75-μm fused silica, +30 kV. Injection: hydrostatic, 20 s at 10 cm. Detection: indirect UV, 214 nm. Peaks: 1 = rubidium (2 ppm), 2 = potassium (5 ppm), 3 = calcium (2 ppm), 4 = sodium (1 ppm), 5 = magnesium (1 ppm), 6 = lithium (1 ppm), 7 = lanthanum (5 ppm), 8 = cerium (5 ppm), 9 = praseodymium (5 ppm), 10 = neodymium (5 ppm), 11 = samarium (5 ppm), 12 = europium (5 ppm), 13 = gadolinium (5 ppm), 14 = terbium (5 ppm), 15 = dysprosium (5 ppm), 16 = holmium (5 ppm), 17 = erbium (5 ppm), 18 = thulium (5 ppm), 19 = ytterbium (5 ppm). (From P. Jandik, W. R. Jones, O. Weston, and R. R. Brown. LC-GC, 1991, 9, 634. With permission.)