Abstract

Oscillating electrophoretic systems are systems exhibiting oscillations in concentration profiles of all ions when electric current is passing through them. These systems were predicted from linear model of electromigration and the oscillations are a direct consequence of complex system eigenmobilities. We searched for ternary oscillating systems composed of two acids and one base. A tool we used was program PeakMaster, which was modified to enable easier and faster finding of systems with complex eigenmobilities and optimization of their composition. We found eight ternary systems with complex eigenmobility and inspected them experimentally. Five of them proved oscillating behavior. We also found one quaternary oscillating system. To compare theory and experiment we calculated in PeakMaster a theoretical position of the system zones with complex eigenmobilities. In experiments we recognized the system zones like a small gap in the pattern of oscillation. Position of this gap was in very good agreement with theoretical prediction by PeakMaster. We confirmed that the complete oscillating pattern travels in the capillary with velocity determined by real part of complex eigenmobility. Also we tested a robustness of oscillation in some systems and compared simulated the amplitude of oscillations with the experimental one. Experiments were further simulated by program Simul.