

Electrokinetic behavior of microdrops in an aqueous two-phase system

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Aqueous two-phase system (ATPS) is an attractive separation system for the purification of biomolecules and specific partitioning of subcellular organelles. Two immiscible liquid phases in ATPS provide milder and more environment-friendly extraction condition than that of organic/aqueous extraction systems. The ATPS in this study was formed by dissolving two different salts, tetrabutylammonium bromide and ammonium sulfate, in water. We will present the electrokinetic behavior of microdrops in this ATPS. A polymeric microfluidic device with microchannels and electrodes was fabricated and the ATPS was applied to it. The chemical composition of each phase, formation of microdrops in microchannels, electrophoretic movement of microdrops and its polarity will be discussed on the basis of microscopic observation. New microfluidic extraction process with droplet formation and coalescence for high contact area is suggested based on the results obtained.