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## Measurement of surface charge at immiscible liquid-liquid interface using streaming-potential-on-microfluidics

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Surface charging at immiscible liquid-liquid interface is essential to the emulsion stability, surfactant adsorption, and various engineering applications such as drug delivery and mineral flotation. However, droplet electrophoresis, as a widely-used electrokinetic method to measure the surface charge density, has various limitations in physical modeling and sample preparation. In this work, an alternative experimental method based on streaming potential setup is proposed. A Y-Y shaped microchannel was used to make a flat and stable liquid-liquid interface. The inner wall was coated with polymer to suppress the interference of the solid-liquid interfacial electrokinetics in the liquid-liquid one. The experimental setup was first verified by revisiting the aqueous solution-silicon surface charging, after which the surfactant-free decane-KCl solution interface charging was investigated. The negative surface charge at the decane-KCl solution interface is confirmed and is found to increase when increasing the pH. This result is compatible with the probable charging mechanism that the acquired negative surface charge results from hydroxyl ion adsorption onto the interface. The proposed method enables the simplicity and flexibility for further side-by-side studies on the liquid-liquid interface charging mechanism and will inspire the quantitative macroscopic interfacial modeling for numerous scenarios, such as the droplet electrophoresis and interfacial electro-hydrodynamics.

### Participation

In-Person

### References

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