

### Charging characteristics of an ionic liquid droplet in a dielectric liquid under electric field

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Ionic liquids show great promise as excellent solvents or catalysts in energy and biological fields due to their unique chemical and physical properties. The ionic liquid droplets in microfluidic systems can also be used as a potential platform for chemical biological reactions. In order to control electrically the ionic liquid droplets in a microfluidic device, the charging characteristics of ionic liquid droplets need to be understood. In this work, the charging characteristics of various ionic liquids are investigated by using the parallel plate electrodes system. Under normal situation, a droplet charged at an electrode travels along the electric field line to touch the opposite electrode. At the electrode, the droplet is charged with opposite polarity and shows backward motion to the original electrode. The behavior of ionic liquid droplet has been analyzed experimentally by the image analysis and the electrometer signal analysis. The study about the charging behavior of an ionic liquid will be helpful to the microfluidic systems with electric control for chemical and biological reactions.