

Electrostatic effects on the droplet contact charging phenomena

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A droplet contact charging phenomenon has been studied as novel microfluidics research subject. However, the fundamental charge transfer mechanism of this interesting phenomenon is still illusive. Most of all, positive and negative charging behavior on the droplet contact charging phenomenon and related electrostatic effects are not studied well. In this work, we investigate how electrostatic effects affect a charge on the droplet contact charging. Precise charge measurements and analysis were performed under various power voltages and electric fields. For more accurate charge measurements, special experimental setups (Two power sources, Faraday cage, etc) were designed and performed. These experimental setups will exclude electrostatic effects existing in our system. Throughout these systematic studies, we have investigated minute change of positive and negative charge on droplet contact charging more rigorously and we found that electrostatic environment affects largely a charge on the droplet contact charging. The results provide fundamental understanding about droplet contact charging in electrochemical aspects.