

Spontaneous charge separation by drop motion across of a hydrophobic tube

Sliding water drops on hydrophobic insulating surfaces leads to charge separation at the three-phase contact line [1]. Although slide electrification has been investigated thoroughly, understanding the exact mechanism is still a challenge. Electron transfer, formation of the electrical double layer structure, and adsorption of ions have been associated to this phenomenon [2]. Slide electrification is mainly studied through the drops motion on a tilted surface [3]. In this study, we make use of the better control over parameters like drop velocity and drop contact time with the surface to investigate the influence of wetting kinetics on charge separation. Furthermore, the effect of PH and salt concentration of water on slide electrification was explored. Our findings not only provide further insight into the charge separation mechanisms but also can be useful for possible future integration of slide electrification into energy harvesting systems.

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[3] C. Hinduja, H.-J. Butt, and R. Berger, " Slide electrification of drops at low velocities," Soft Matter, 2024.

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