Beitrag ID: **15** Typ: **Poster**

Studying the surface charge density as the contact line dewets the surface

Montag, 4. Dezember 2023 18:10 (20 Minuten)

Charge separation in liquid drops sliding over a hydrophobized insulator surface is a well-known phenomenon and lots of efforts have been made to harness this effect for energy harvesting. However, a comprehensive understanding of the local surface charge density ,σ, left behind by the sliding drop (receding contact line) is still lacking. Moreover, the behavior of surface charge density as multiple drops slide down the substrate is not fully understood. To close this gap of knowledge, we use a method based on mirror charge detection to locally measure surface charge density as drops dewets the hydrophobic surface. For this purpose, we positioned a metal electrode beneath the hydrophobic substrate to measure the capacitive current and by analyzing this current, we investigated the surface charge density left on different dielectric surfaces and studied the surface neutralization processes. Our observations indicate that around 20-30\% of solid-liquid surface charge density from the electric double layer (EDL) is left on the surface. The surface neutralizes over time and the neutralization time,τ, is influenced by the substrate and the surrounding environment. We present an analytical model that connects the solid-liquid surface charge to solid-air surface charge, which offers insights into the surface charge neutralization and gives the relevant parameters. Understanding these parameters and refining them could aid in optimizing the efficiency of solid-liquid charge separation.

Hauptautor: BISTA, Pravash

Co-Autoren: WEBER, Stefan; BUTT, Hans-Jürgen

Vortragende(r): BISTA, Pravash

Sitzung Einordnung: Poster Session