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Slide electrification of water droplets over CYTOP electrets surfaces

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Abstract
Drops sliding on surfaces can result in charging of drops and surfaces. Thus subsequent sliding drops can interact with charged surface differently[1]. Drops slide electrification effects are one way how surfaces adapt[2]. Fluorinated surfaces typically exhibit drop slide electrification phenomena. CYTOP is an amorphous hydrophobic fluoropolymer that can be used to create electret films. CYTOP finds plethora of applications in microelectronic devices for sustainable energy and memory devices which demands high voltage breakdown, high dielectric constant, and amorphous structure, transparency, and charge storage capabilities. Here, we present direct quantification and mapping of surface charge on CYTOP film at room temperature using advanced scanning probe microscopy (SPM) technique such as Kelvin Probe Force Microscopy (KPFM) and Electrostatic Force Microscopy (EFM)[3]. We calculated the surface charge densities are of 0.7 ⊠C/cm2 and 1.5 ⊠C/cm2 for positive and negative charges respectively which are injected at the certain areas on the surface employing the SPM tip by applying controlled bias voltages further, we have estimated the charge retention time for both positive and negative charges which are impinged on this polymer. We found that the retention capacity of the CYTOP film for the injected negative charges is much higher than the injected positive charges. In a next step we will investigate how injected charges influence the sliding behavior of drops.
References
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- **List item**

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