Electronic Supplementary Material for "Physical Chemistry Chemical Physics"

Supplementary information for:

Electro-wetting of a Nanoscale Water Droplet on a Polar Solid Surface in Electric Fields

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Hydrogen bonds:

In MD simulation, there is a criterion of geometrical definition to determine whether a hydrogen bond has formed or not between different water molecules. Firstly, the distance between oxygen atoms is less than 0.35 nm; secondly, the angle between the oxygen-hydrogen bond and oxygen-oxygen direction is less than 30 degree [Luzar, A.; Chandler, D., Hydrogen-bond kinetics in liquid water. *Nature*, 1996, **379**, 55-57]. If these two conditions are satisfied, one hydrogen bond is considered to be formed between them.

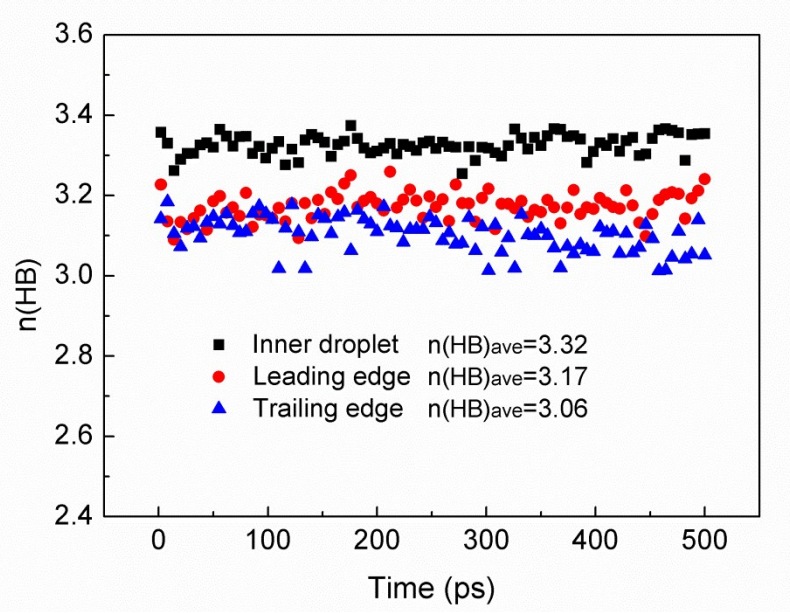

Figure S1. The average number of hydrogen bonds per molecule during the electrowetting process (E=0.40 V·nm^{-1})

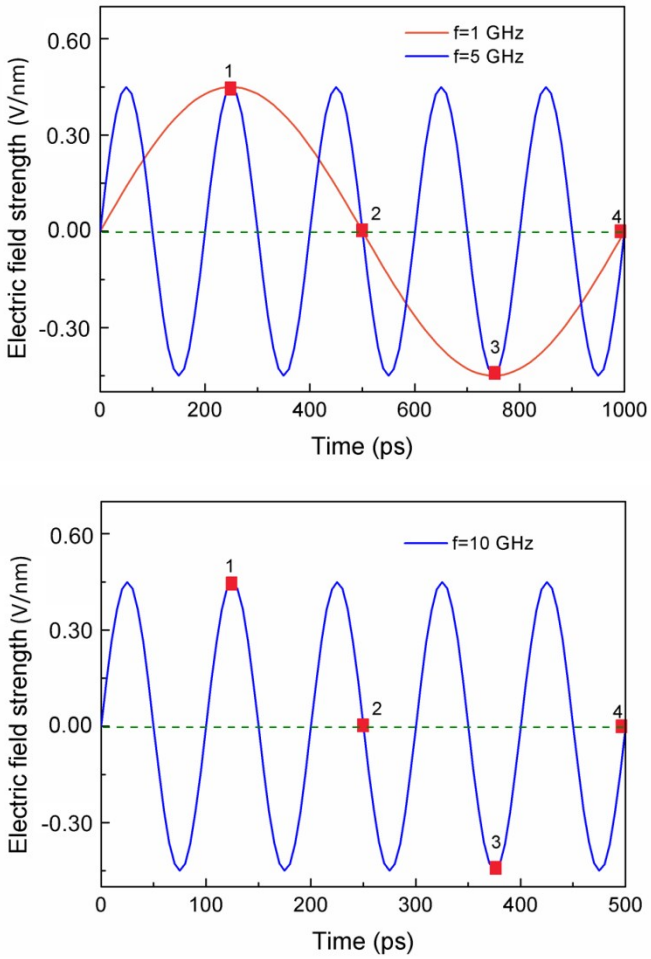

Figure S2. Distribution of alternative electric field with different frequencies (f=1, 5, 10 GHz), red square represents the time point of the snapshots of water droplets described in figure 6 in the paper.

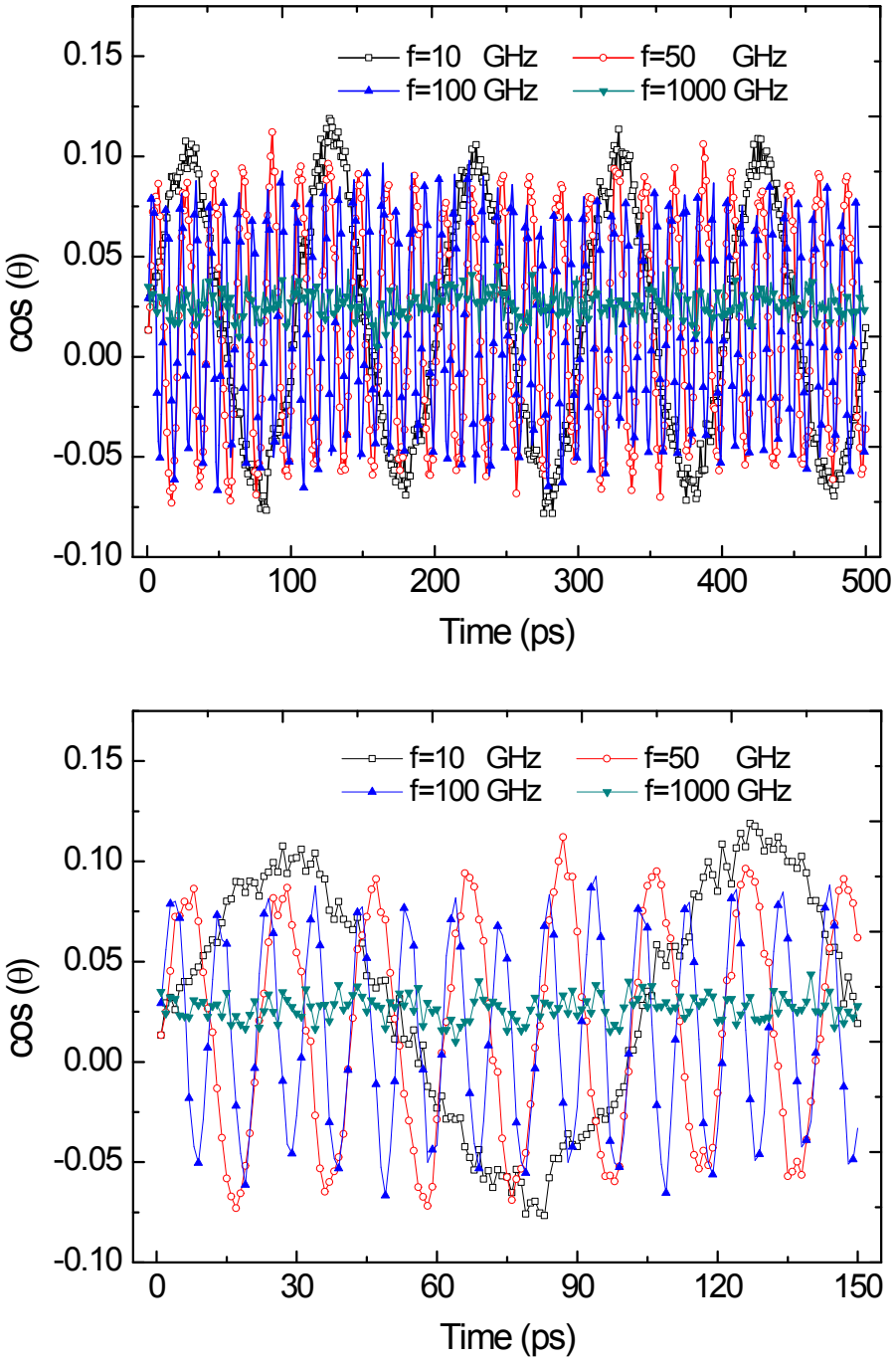

Figure S3. The average of the cos (θ) values of the water molecules on silica solid surface along the field direction as a function of time under the alternative electric fields with frequencies of 10, 50, 100, 1000 GHz. (E_0=0.45 V·nm^{-1})