

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Spreading of Electrolyte Drops on Charged Surfaces: Electric Double Layer Effects on Drop Dynamics KYEONG BAE, SHAYANDEV SINHA, GUANG CHEN, SIDDHARTHA DAS, Univ of Maryland-College Park — Drop spreading is one of the most fundamental topics of wetting. Here we study the spreading of electrolyte drops on charged surfaces. The electrolyte solution in contact with the charged solid triggers the formation of an electric double layer (EDL). We develop a theory to analyze how the EDL affects the drop spreading. The drop dynamics is studied by probing the EDL effects on the temporal evolution of the contact angle and the base radius (r). The EDL effects are found to hasten the spreading behaviour – this is commensurate to the EDL effects causing a “philic” tendency in the drops (i.e., drops attaining a contact angle smaller than its equilibrium value), as revealed by some of our recent papers. We also develop scaling laws to illustrate the manner in which the EDL effects make the r versus time (t) variation deviate from the well known $r \sim t^n$ variation, thereby pinpointing the attainment of different EDL-mediated spreading regimes.

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Date submitted: 31 Jul 2015

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