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Self-pinning of a Nanosuspension Drop: MD Simulations BAIOU SHI, EDMUND WEBB, Lehigh University — The behavior of nano-fluids, or fluid suspensions containing nano-particles, has garnered tremendous attention recently for applications in advanced manufacturing. Contact line pinning by the particles or self-pinning has been extensively considered during contact line retreat due to solvent evaporation. Here we will present our results from MD simulations on self-pinning of an advancing contact line. For a wetting system of identical liquid, solid and particle chemistry yet significant difference in advancing contact angles, self-pinning is observed for low θ_{adv} whereas it is not for high θ_{adv}. The role of contact angle in determining likelihood for self-pinning is investigated on fundamental time and length scales. Meanwhile, relations between contact line velocity and advancing contact angle will be discussed from atomic scale computation results. The precursor film continues to advance across the surface even when the droplet is pinned. However a single layer of liquid on the outer facet of the particle surfaces is observed which manifests a rate limiting step for the precursor film advance.

Baiou Shi
Lehigh Univ

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