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Effects of induced vibration modes on droplet sliding phenomena[1]
JOSE EDUARDO MEJIA, JORGE ALVARADO, Texas AM University, CHUN-WEI YAO, Lamar University, DROPWISE CONDENSATION COLLABORATION, ENGINEERED SURFACES COLLABORATION — An analytical and experimental investigation has been undertaken to understand the effects of induced vibration modes on droplet sliding phenomena. A mathematical model has been postulated which is capable of estimating accurately droplet sliding angles when using hydrophobic and hydrophilic surfaces. The model, which takes into account equilibrium contact angle, contact angle hysteresis, and droplet volume, has been validated using experimental data. The model has been modified to be able to estimate droplet sliding angle when different modes of vibrations are imposed on the surfaces. Experimental results to date reveal that when resonance modes of vibrations are imposed, the droplet sliding angles decrease considerably. The results also indicate that the modified model can be used effectively to relate imposed resonance frequencies to the critical sliding angle of droplets.

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