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**Fluid Dynamics of Condensed Droplets on Hybrid Surfaces** CHUN WEI YAO, JORGE ALVARADO, Texas A&M University, CHARLES MARSH, Engineer Research and Development Center, U.S. Army Corps of Engineers, ANTHONY JACOBI, University of Illinois at Urbana-Champaign, TEXAS A&M TEAM, ERDC/UIUC TEAM — Droplets impinging on hybrid surfaces consisting of a micropillar array of hydrophobic and hydrophilic sites exhibit a distinct wetting behavior that can be estimated using a surface energy-based model. However, condensed droplets display a quite different wetting behavior when they grow on hybrid surfaces. In this study, hybrid surfaces with four different spacing ratios were tested in a condensation cell. For hybrid surfaces with spacing ratio below 2, initial droplets form on the top of the micropillars, and then grow and coalesce with adjacent droplets, which shed after they reach a given size. After shedding, the top surface remains partially dry which allows for faster droplet re-nucleation. Droplet growth and coalescence continue until very large droplets are formed which is a characteristic behavior of Wenzel droplets For hybrid surfaces with spacing ratio equal to 2, a quite interesting wetting behavior is observed when droplets coalesce. The coalesced droplets form a thin liquid film, which sheds eventually under the right conditions. The results indicate that spacing ratio is the key factor for having different fluid dynamics of condensed droplets on hybrid surfaces.

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