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Evaporation and impact of water droplet on superhydrophobic surfaces PEICHUN TSAI, MAURICE HENDRIX, REMCO DIJKSTRA, ROB LAMMERTINK, MATTHIAS WESSLING, DETLEF LOHSE — We examine both quasi-static and dynamic effects of water droplets upon hydrophobic microstructred surfaces, which possesses a high contact angle $\sim 150^\circ$ for the droplet size of ~ 1 mm in radius. First, a milli-meter sized water droplet sitting on microstructures under a natural evaporation can undergoes a transition from a heterogenous (Cassie-Baxter) to a homogenous (Wenzel) wetting state, when the droplet size is reduced to about a couple hundred microns. The contact angle changes during the evaporation. With the evolution of the contact angle, a model based on global surface energies was developed to predict the transition points, which agree well with the experimental data. Secondly, water droplet impinging on the superhydrophobic surface can completely rebound off the surface when the impacting kinetic energy is comparable with the surface energy. As an increase of kinetic energy is about a few hundred times larger than the surface tension, a splash–emitting satellite droplets–occurs during the advancing phase of the lamella. We will discuss the influence of the geometric patterns on the splash.

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