Supplementary Information

High-efficient fog harvesting on superhydrophobic microfiber through droplet oscillation and sweeping

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Keywords: (fog harvesting; superhydrophobic microfiber; water collection; droplet transport; droplet oscillation and sweeping)

Content:

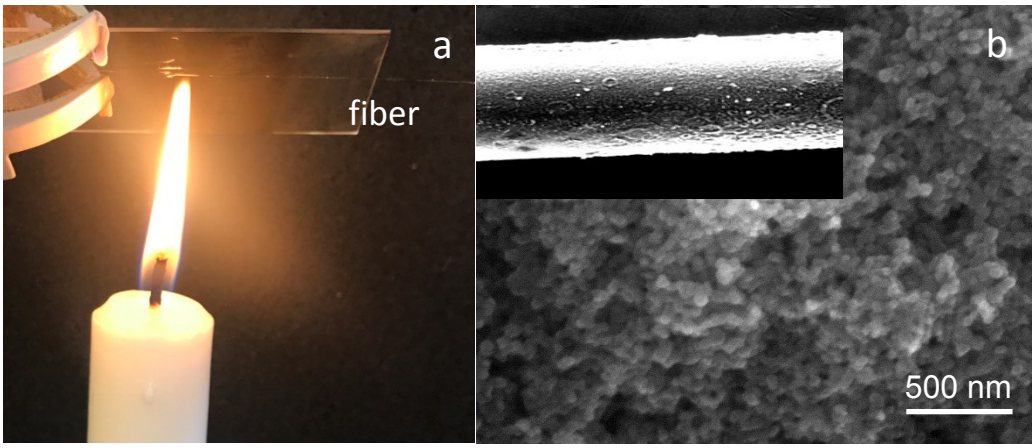

Figure S1: Fabrication of superhydrophobic microfiber through flame synthesis coated with thin layer of assembled carbon nanoparticles. (a) The detailed experimental fabrication process of superhydrophobic fiber surface. Silica fiber under 45° tilted glass slide was held horizontally and rotated continuously 360° to grow assembled carbon nanoparticles. (b) High resolution SEM image of the morphology of carbon nanoparticle. The morphology of carbon nanoparticles is fractal-like structured.

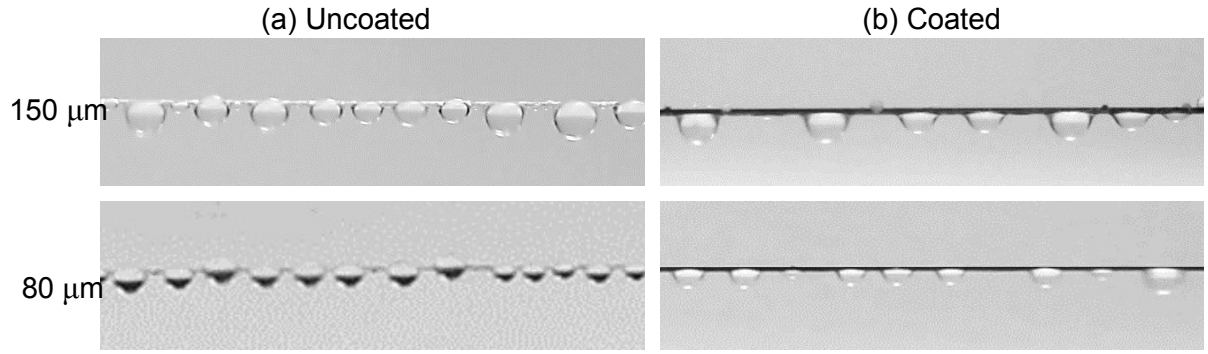

Figure S2: Effect of microfiber size on the condensed droplet size for both uncoated (a) and coated fiber (b). The hanging droplet size is inversely proportional to the fiber diameter on both fibers.μ

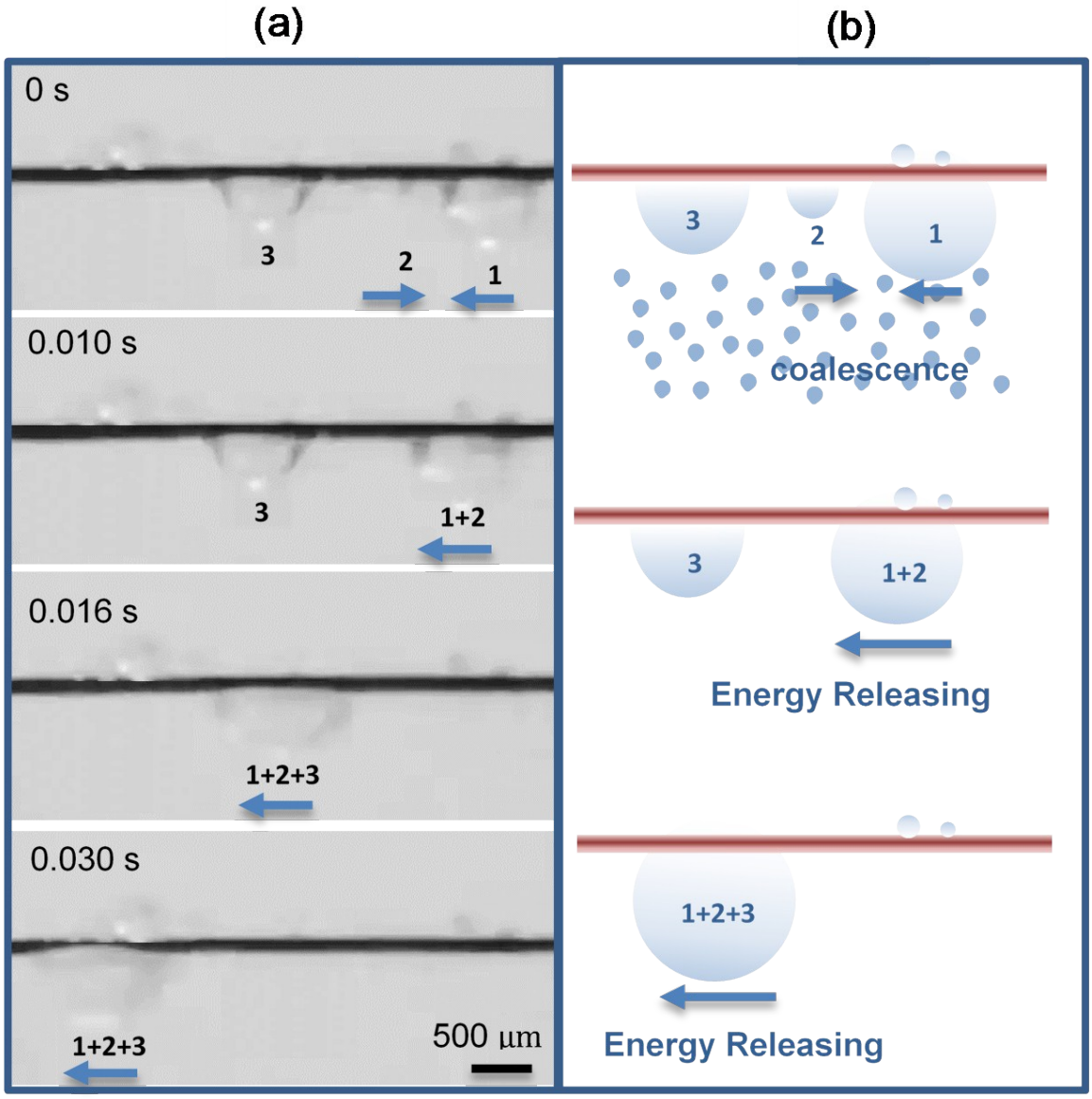

Figure S3: The dynamic transport of droplet coalescence captured by high speed camera in a short time scale of 0.03 s (a) and corresponding schematic illustration (b). Droplets hanging on the superhydrophobic coated fiber start transporting and sequentially merge other droplets by releasing coalescence energy.

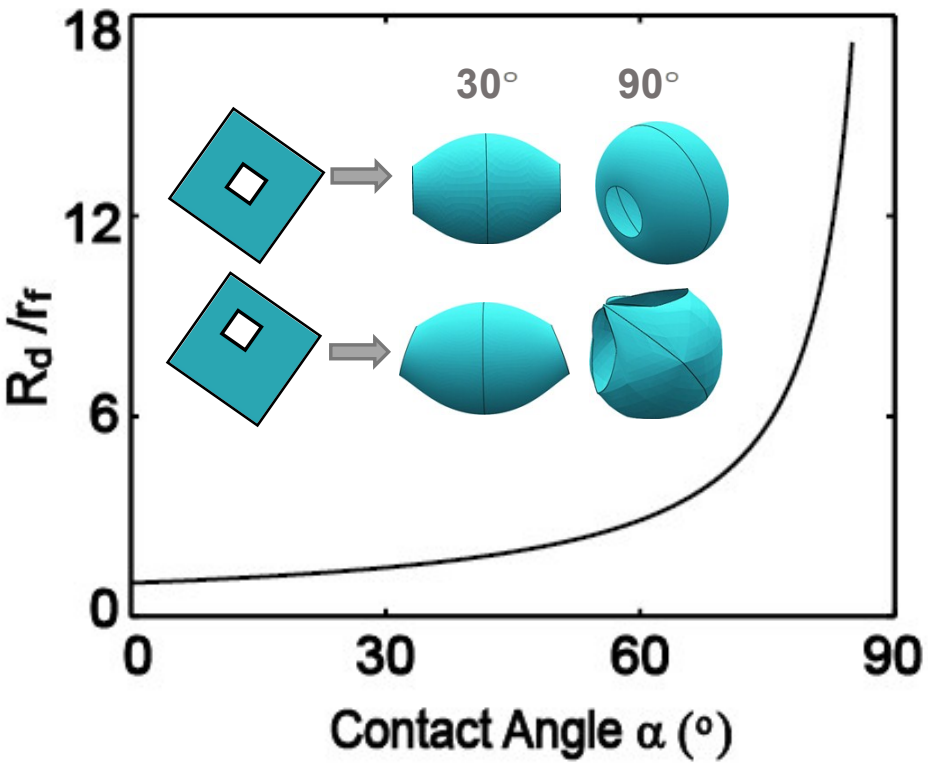

Figure S4: The normalized radius R_d/r_f of droplets *vs.* contact angle α. The inset shows the simulated equilibrium conformation of hanging droplets before (top) and after perturbation (bottom) with α = 30˚ and 90˚**.**

Supporting Videos:

Videos S1: Dynamic process of water collection on a horizontal uncoated fiber. Uniform barrel-shaped droplets were first formed on the uncoated fiber. As time increased, droplets grew larger and became pinned on the bottom side. Finally, the droplets were removed by gravity.

Video S2: Dynamic process of water collection on a horizontal coated fiber. After initial water condensation, droplets started oscillating and coalescing sequentially. Coalescence of droplets efficiently cleaned up the fiber surface. After that, a new round of water condensation happened on the coated surface.

Video S3: Dynamic process of water collection on a horizontal coated fiber under lower flow rate of 0.5m/s. Droplets slowly grew large, oscillated slower and finally coalesced to each other.

Video S4: Dynamic process of water collection on a horizontal uncoated fiber with lower flow rate of 0.5m/s. Similar to the Video S1**,** Droplets pinned on the uncoated fiber but grew slower.

Video S5: Dynamic process of water collection on uncoated fiber with a tilting angle of 5 °. Similar to the horizontal uncoated fiber, droplets pinned on specific sites and removed by gravity.

Video S6: Dynamic process of water collection on coated fiber with a tilting angle of 5°. With external gravity force, water droplets transported directionally downward and swept all the other drops ahead of it. After that, new tiny droplets nucleated sequentially and grew on the swept region.