Electronic Supplementary Material (ESI) for RSC Advances.


# Supporting Information

# Beetle-like Droplet-jumping Superamphiphobic Coatings for Enhancing Fog Collection of Sheet Arrays

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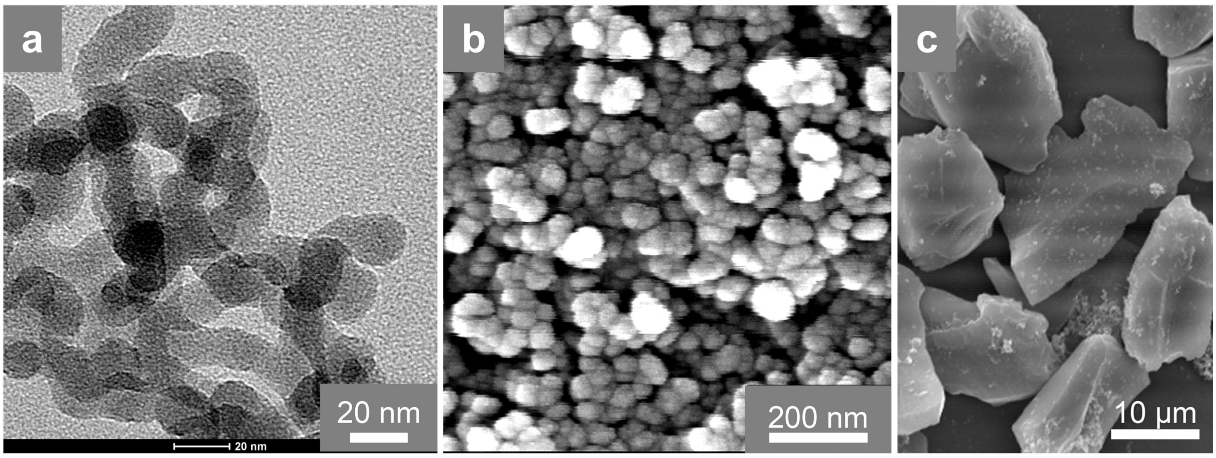


**Fig. S1** Surface morphology of the nano-$SiO_2$ particles, Nano and SiC particles. (a) TEM image of the nano-$SiO_2$ particles. (b) SEM image of the Nano. (c) SEM image of the original SiC particles.

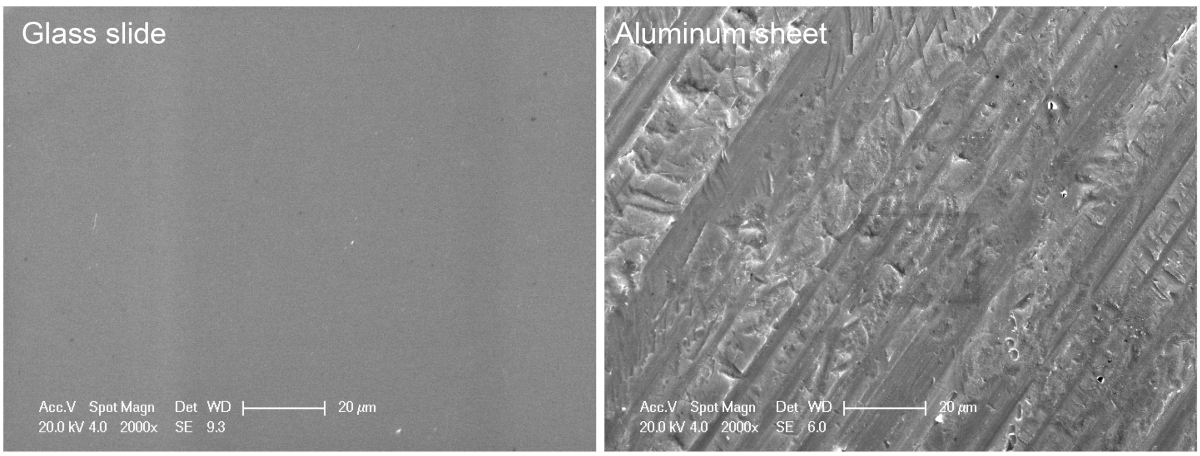


**Fig. S2** SEM images of the glass slide and aluminum sheet.

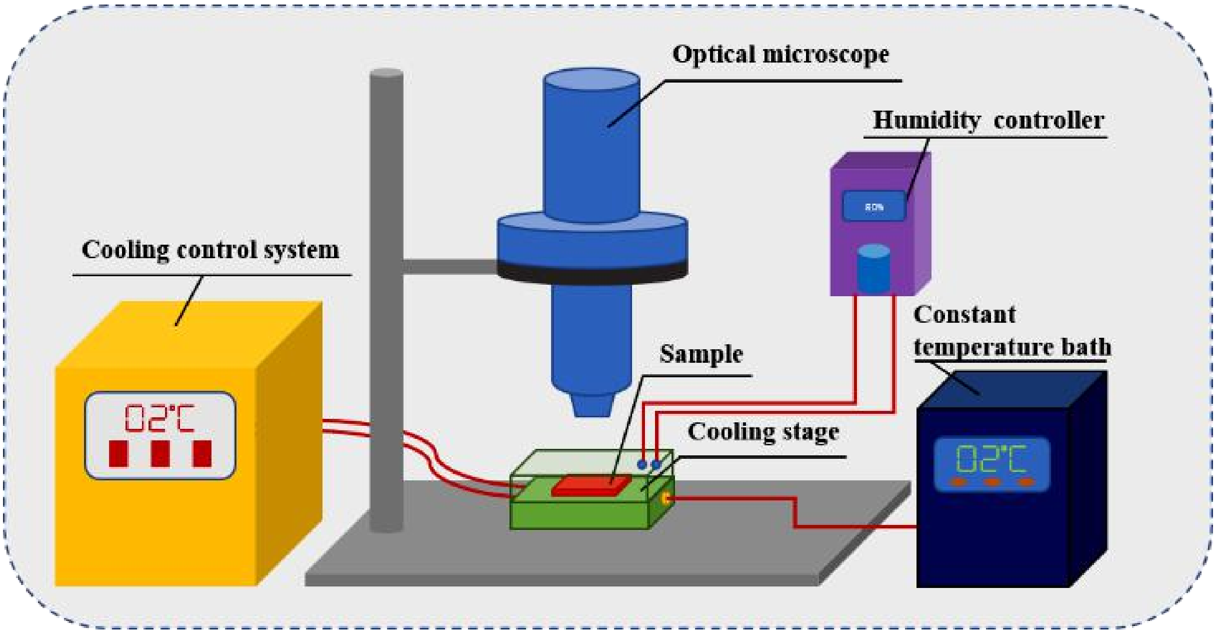

**Fig. S3.** Schematic diagram of the condensation test system.

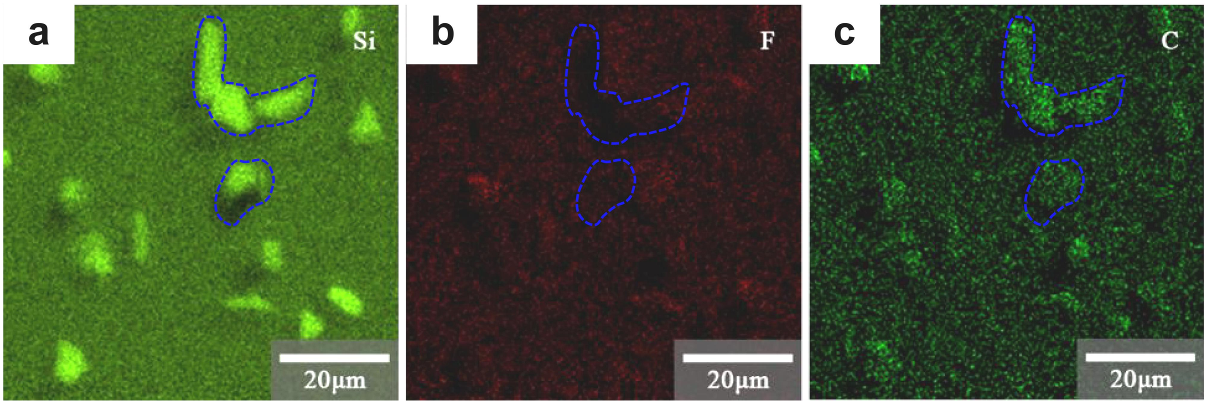

**Fig. S4** Elements distribution of the BSC. (a) Elements distribution of silicon (Si). (b) Elements distribution of fluorine (F). (c) Elements distribution of C. As shown in the blue wireframe areas, there is little F in the area where SiC particles are present, and large amounts of F are found in the $SiO_2$ regions, which indicates that the wettability of the SiC regions is weaker than that of the $SiO_2$ region, and the nonuniform wettability of the BSC is proved.

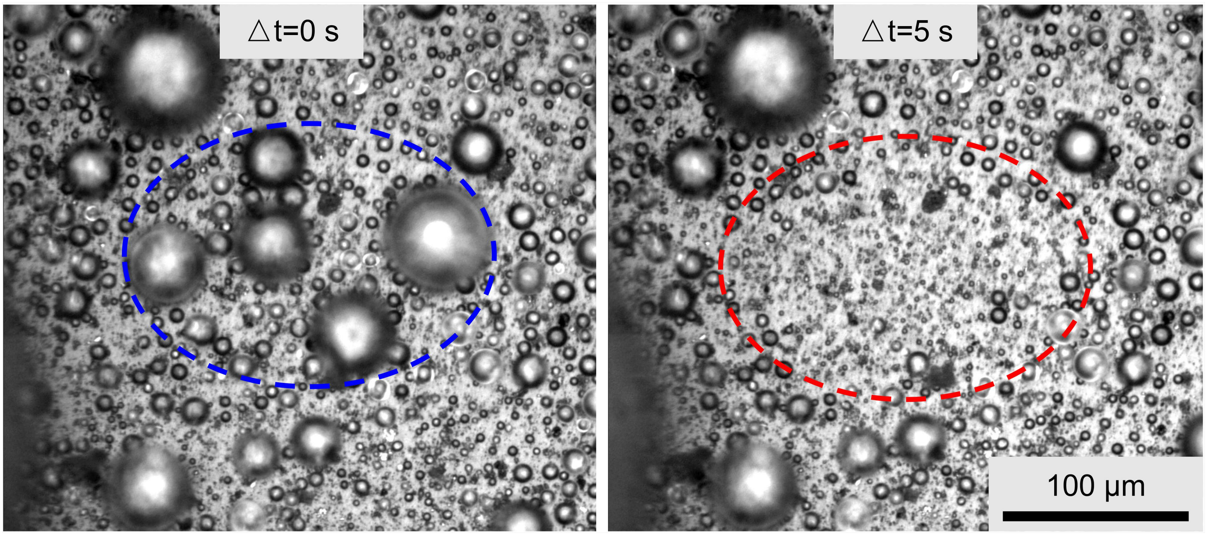


**Fig. S5** Drops coalescence and self-repelled jumping on the surface of the BSC. The blue wireframe area represents the state of the water drops without jumping, and the red wireframe area represents the state of the water drops after jumping.

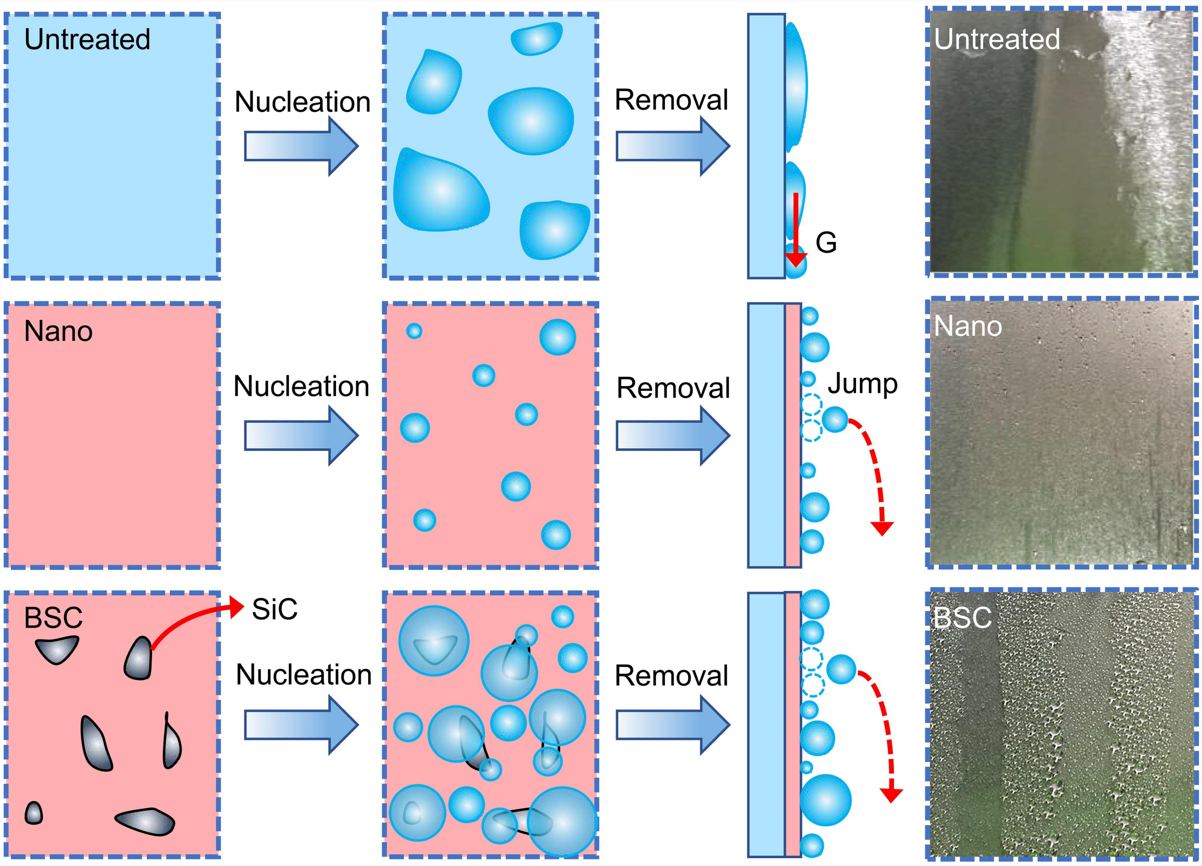


**Fig. S6** Enhancing nucleation and self-repelled jumping mechanism on the surface of the BSC. For the untreated aluminum sheet, it is hydrophilic surface and drops adhere to the surface and water droplets are difficult to remove. For the Nano, droplet nucleation is restrained, which resulting in low surface nucleation rate. So, even though the water droplets can be removed by self-repelled jump, and the low nucleation rate results to the low efficiency of water collection. Finally, due to the addition of SiC particles, the nucleation rate and drop removal efficiency of the hybrid coating surface were enhanced, which resulting in high water collection rate for this biomimetic surface.

## Supporting Movies

**Movie S1** Superamphiphobic (superhydrophobic and superoleophobic) performance on the surface of BSC and Nano.

**Movie S2** Drops self-repelled jumping, drops adhesion and drops collisions behaviour between two parallel surfaces.

**Movie S3** Drops self-repelled jumping on the non-collision surface.