

Supporting Information

Porous micro/nano-structured polyethylene film prepared by picosecond laser for agricultural passive cooling

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This file contains Supplementary Fig. S1-S12 and Video S1.

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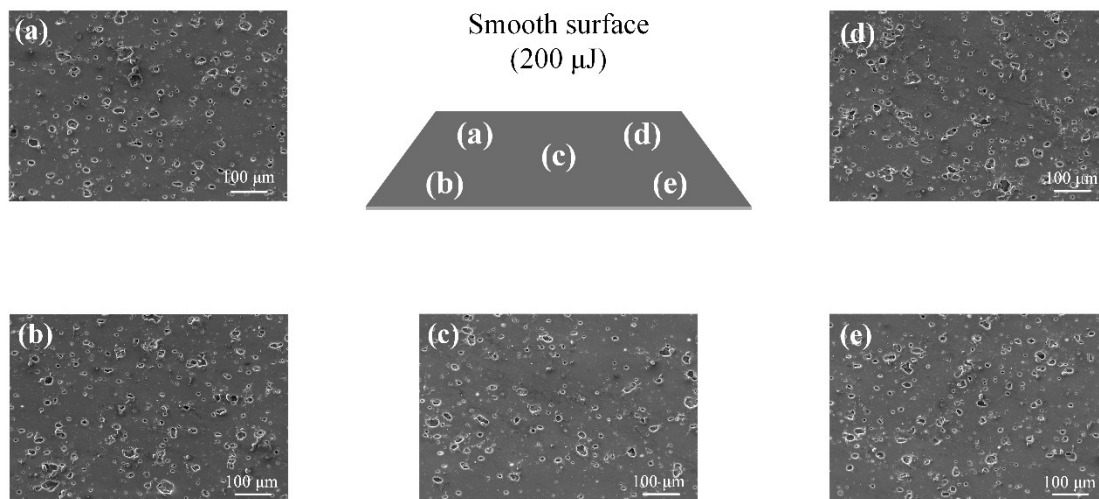


Figure S1. Morphological characteristics (SEM images) at different positions on the SLS (200 μJ) film surface.

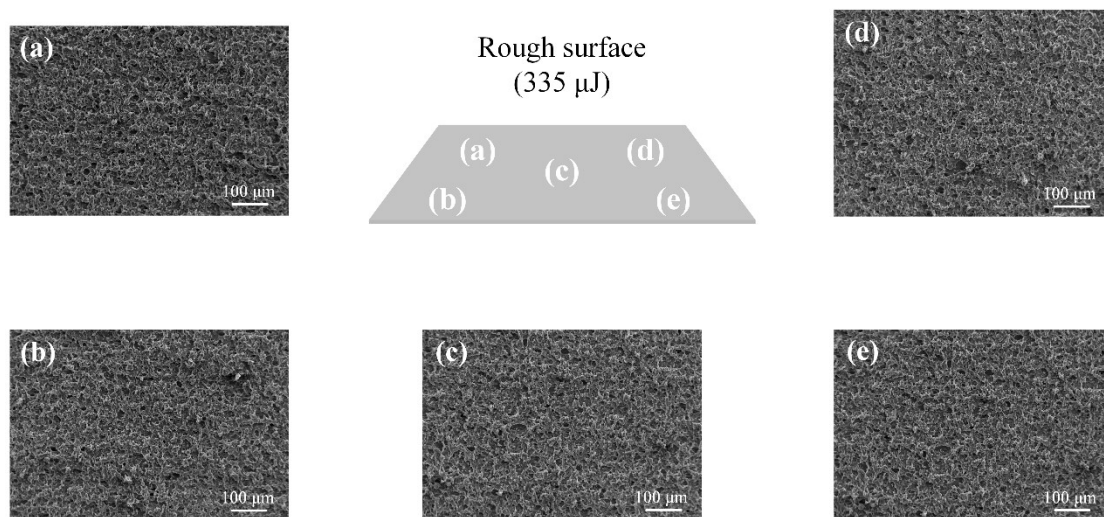


Figure S2. Morphological characteristics (SEM images) at different positions on the RHS (335 μJ) film surface.

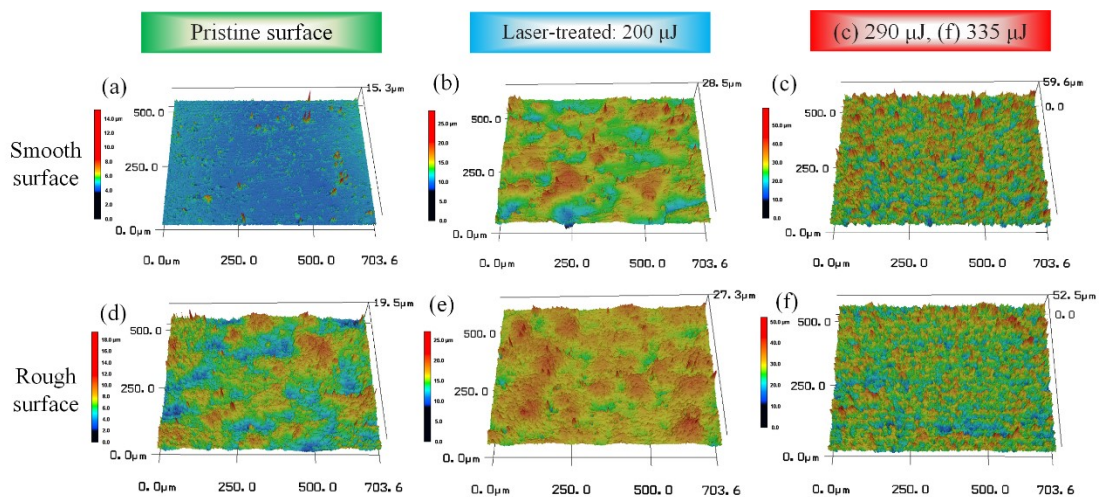


Figure S3. The morphology of SPE (a), SLS (b), SHS (c), RPE (d), RLS (e), and RHS (f) films observed by laser confocal microscopy.

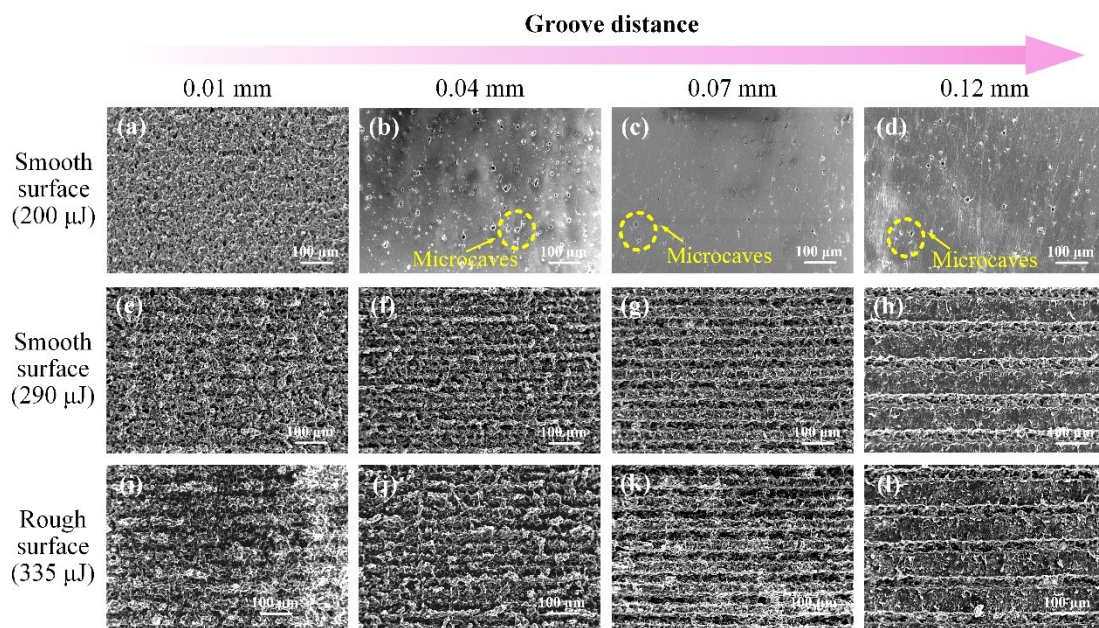


Figure S4. Morphology characteristics of PE films at different laser energies and groove distance.

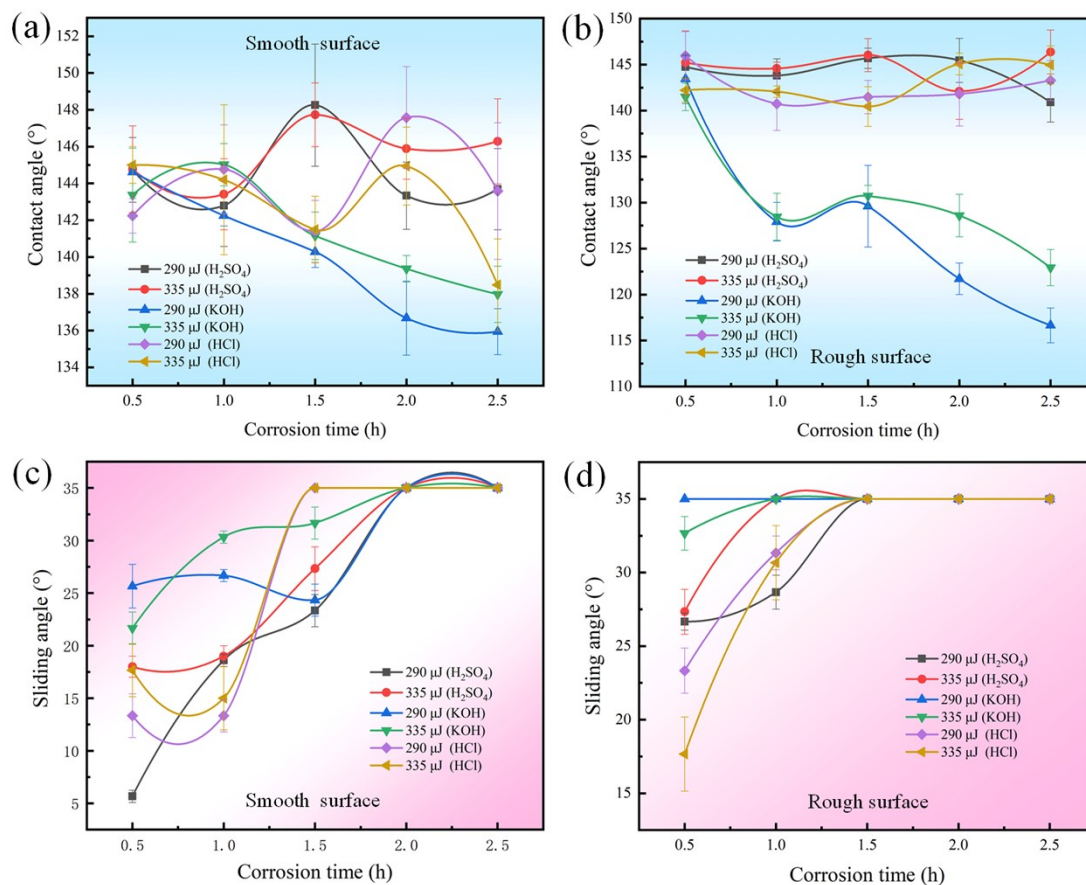


Figure S5. WCAs of the smooth (a) and rough (b) surface films (0.04 mm groove spacing), SAs of the smooth (c) and rough (d) surface films (0.04 mm groove spacing) after 2.5 h of corrosion.

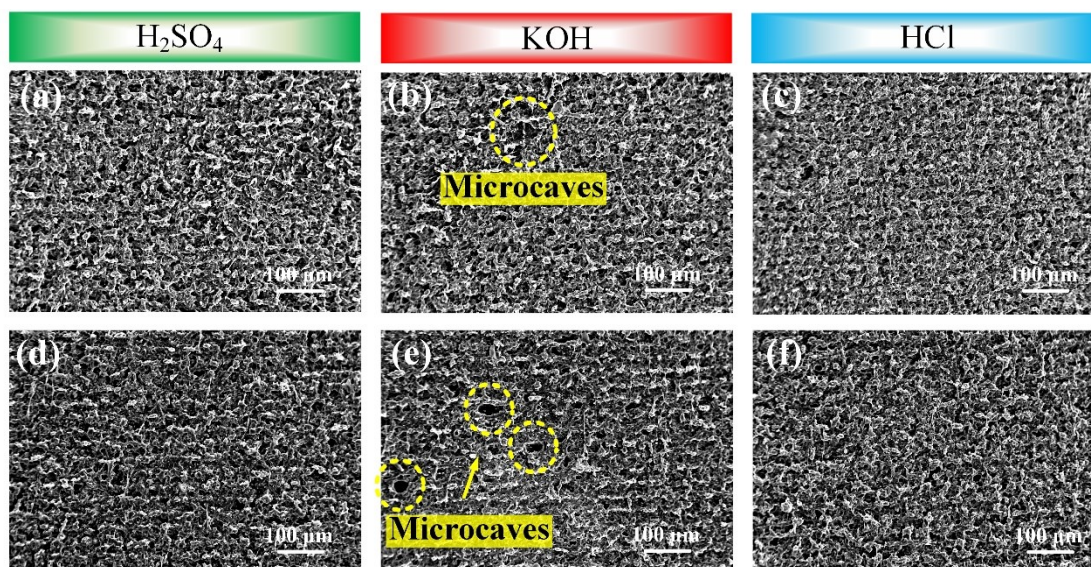


Figure S6. The surface morphology of the film after H₂SO₄, KOH, and HCl corrosion. (a-c) SHS (290 μJ laser power, 0.03 mm groove spacing). (d-f) RHS (335 μJ laser power, 0.03 mm groove spacing).

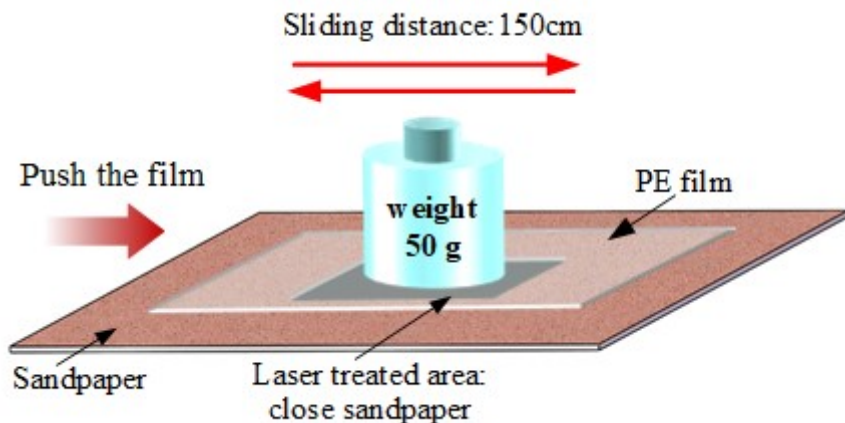


Figure S7. Schematic diagram of the sandpaper abrasion tests on laser-treated PE films.

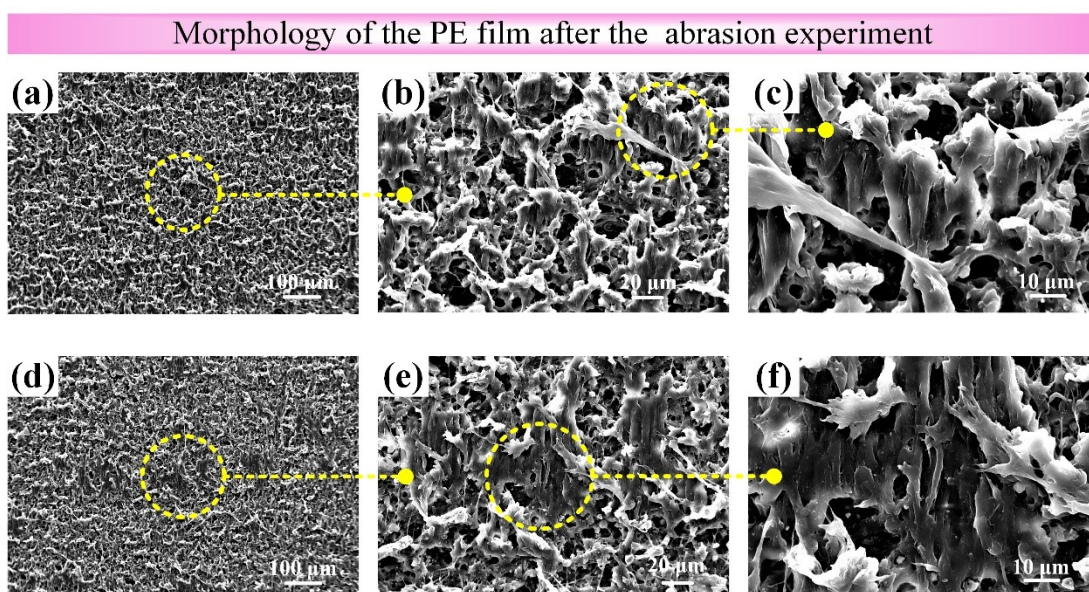


Figure S8. Surface morphology of SHS (a) and RHS (d) films after sandpaper abrasion tests. (b), (c), (e), and (f) are the corresponding magnified images.

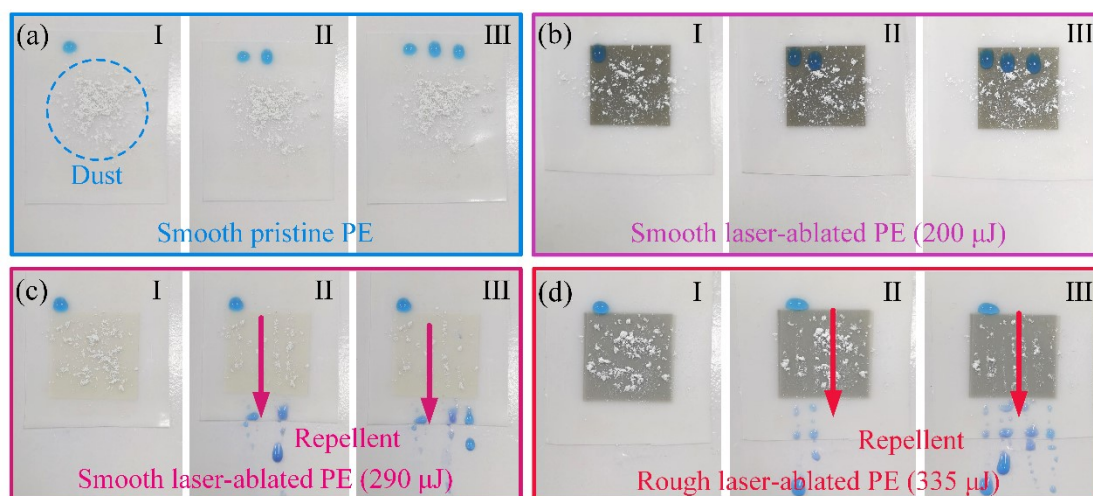


Figure S9. Self-cleaning property text of the SPE (a), SLS (b), SHS (c), and RHS (d) film.

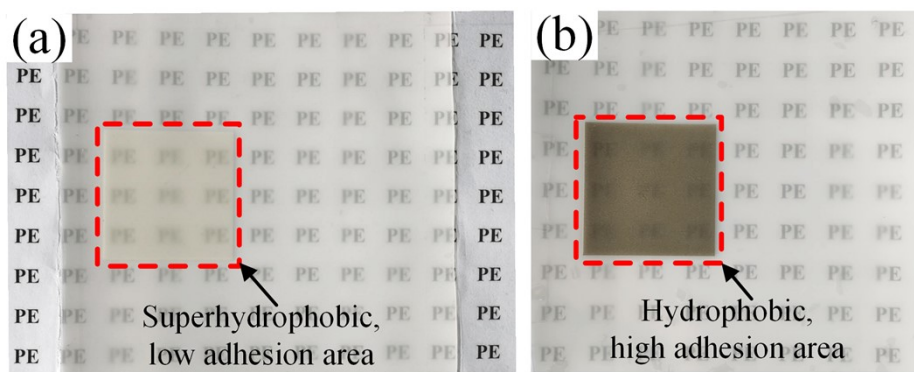


Figure S10. Transparency of pristine and laser-treated PE films. The morphology and transparency of the superhydrophobic and low sliding angle (a), hydrophobic and high sliding angle (b) area prepared by laser in the red dotted box.

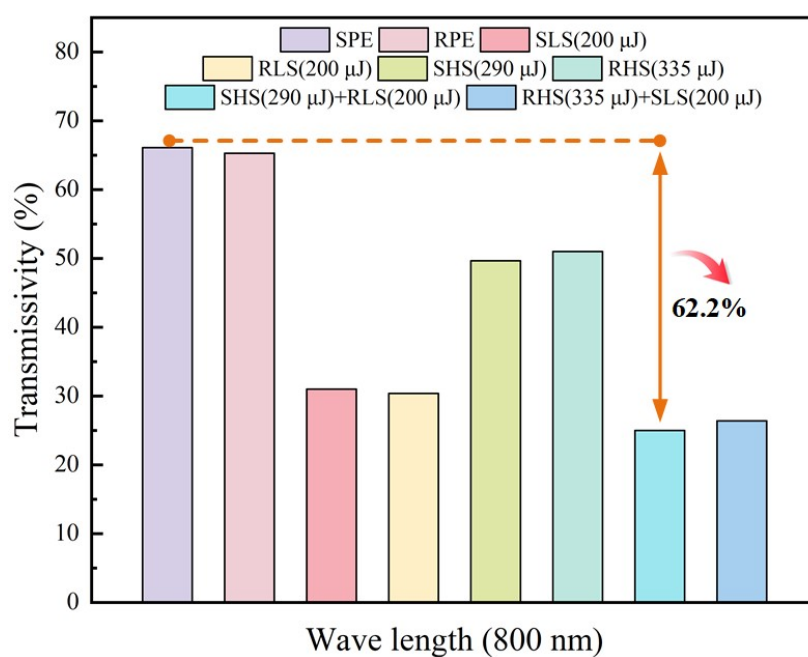


Figure S11. The transmissivity of pristine and laser-ablated PE films at 800 nm wavelength.

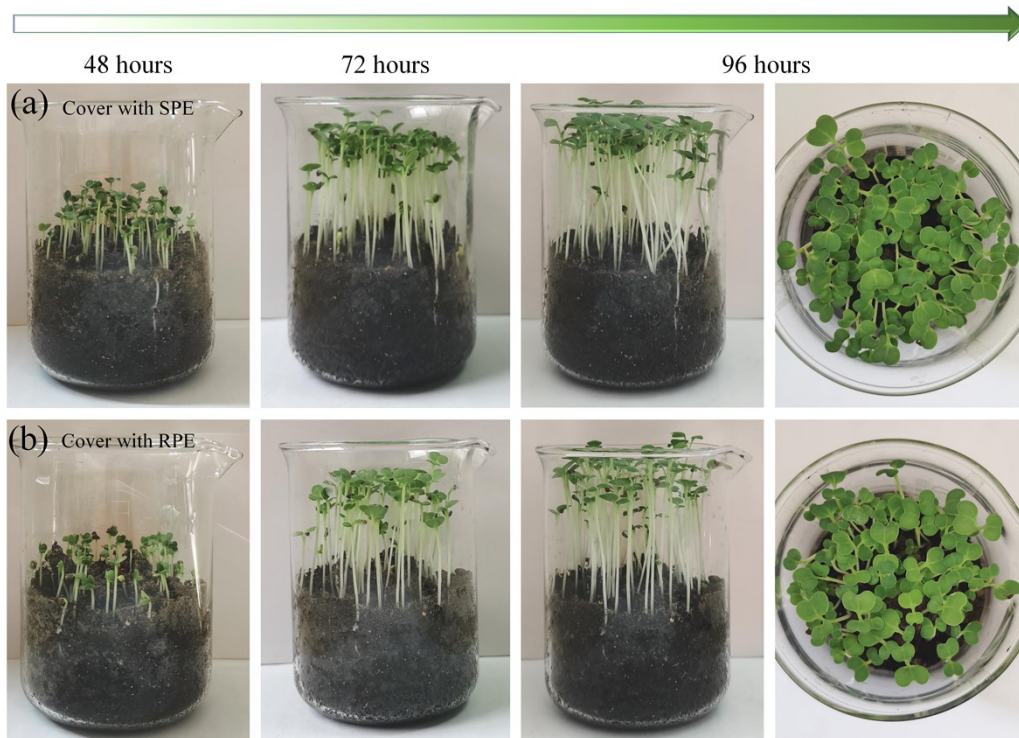


Figure S12. The growth of plants covered with pristine PE film. (a) SPE, (b) RPE.

Video S1 Movement of water droplets on superhydrophobic and low adhesion film surfaces (RHS).