Electronic Supplementary Material (ESI) for Soft Matter.


## Supporting Information

# Influence of long-range forces and capillarity on the function of underwater superoleophobic wrinkled surfaces

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| P4VP Coating thickness (nm) | Hexadecane | | | | Sesame oil | | | |
|---|---|---|---|---|---|---|---|---|
| | Plasma untreated | | Plasma treated | | Plasma untreated | | Plasma treated | |
| | Contact angle (º) | Roll-off angle (º) | Contact angle (º) | Roll-off angle (º) | Contact angle (º) | Roll-off angle (º) | Contact angle (º) | Roll-off angle (º) |
| 16 | | | 160 ± 8 | 26 ± 18 | | | 167 ± 4 | 37 ± 26 |
| 36 | 169 ± 1 | 18 ± 7 | 167 ± 5 | 2 ± 3 | 158 ± 8 | 47 ± 13 | 167 ± 5 | 13 ± 18 |
| 241 | 164 ± 3 | 6 ± 1 | 167 ± 2 | 6 ± 3 | 168 ± 5 | 18 ± 3 | 171 ± 3 | 13 ± 4 |
| **P4VP Coating thickness (nm)** | **Petroleum benzene** | | | | **Paraffin oil** | | | |
| | **Plasma untreated** | | **Plasma treated** | | **Plasma untreated** | | **Plasma treated** | |
| | **Contact angle (º)** | **Roll-off angle (º)** | **Contact angle (º)** | **Roll-off angle (º)** | **Contact angle (º)** | **Roll-off angle (º)** | **Contact angle (º)** | **Roll-off angle (º)** |
| 16 | | | 164 ± 13 | 24 ± 20 | | | 170 ± 2 | 25 ± 19 |
| 36 | 162 ± 10 | 28 ± 16 | 164 ± 3 | 5 ± 2 | 165 ± 11 | 31 ± 18 | 166 ± 5 | 11 ± 3 |
| 241 | 160 ± 12 | 8 ±2 | 160 ± 4 | 7 ± 4 | 168 ± 1 | 8 ± 3 | 166 ± 6 | 11 ± 4 |

**Table S1:** Underwater contact angle and roll-off angle of different oils on the plasma treated and untreated wrinkled P4VP as a function of coating thickness.

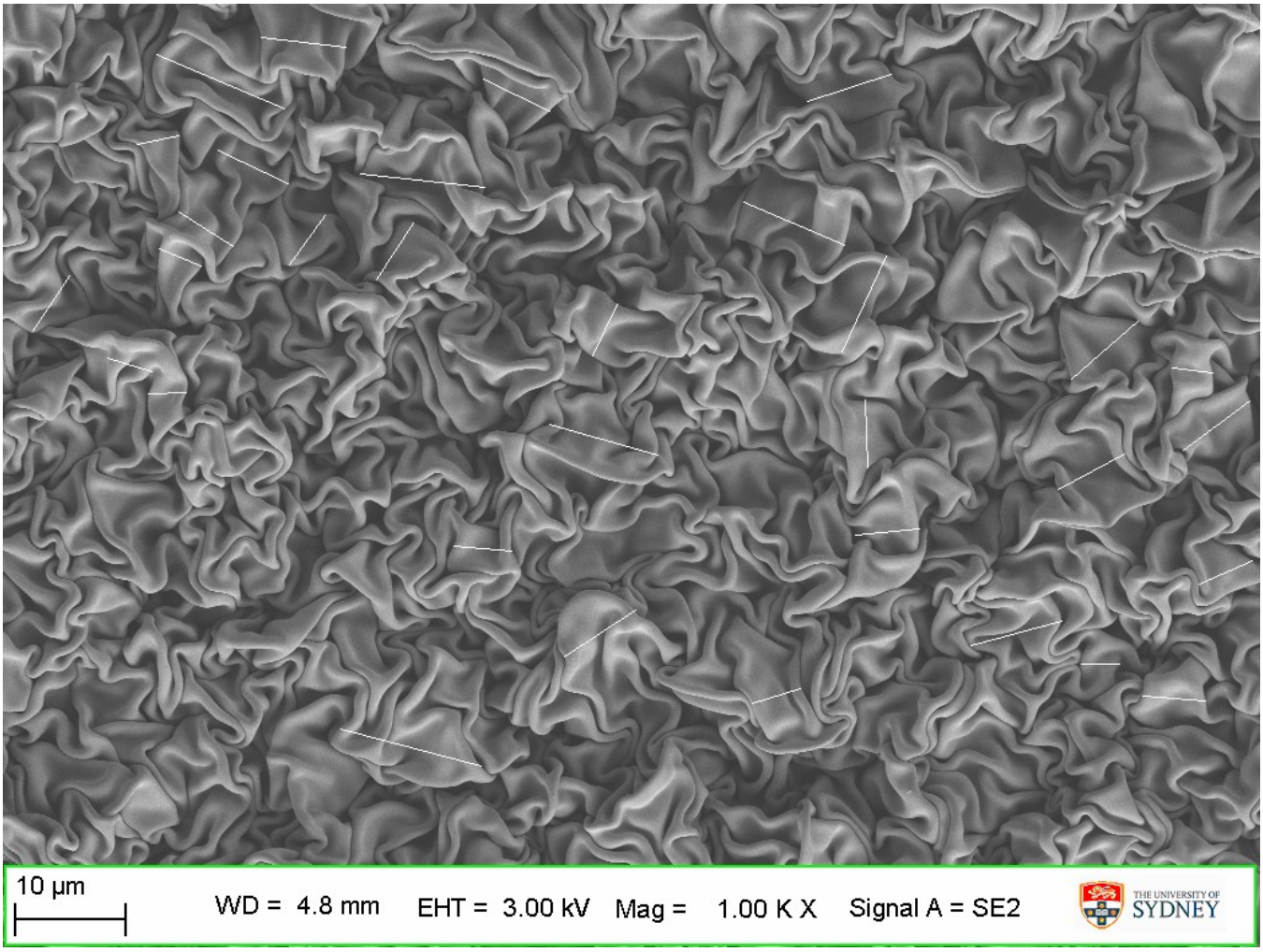


**Fig. S1:** The measurement of the width of folds on the 241 nm-thick wrinkled P4VP surfaces is shown in this SEM micrograph. Measurement taken by Image J.

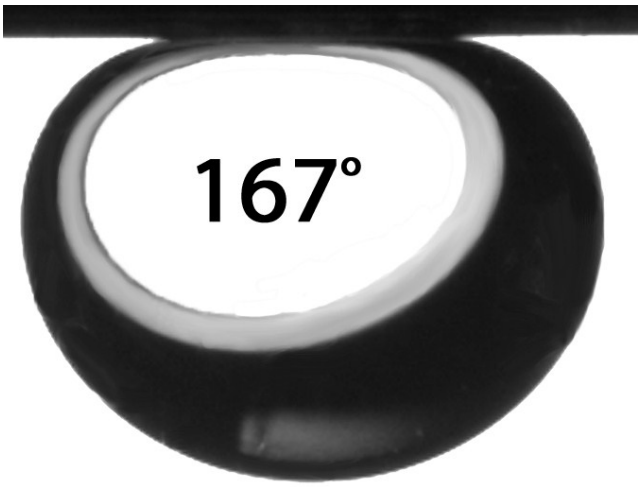


**Fig. S2**: Underwater contact angle of hexadecane on a 22 nm-thick smooth gold film.

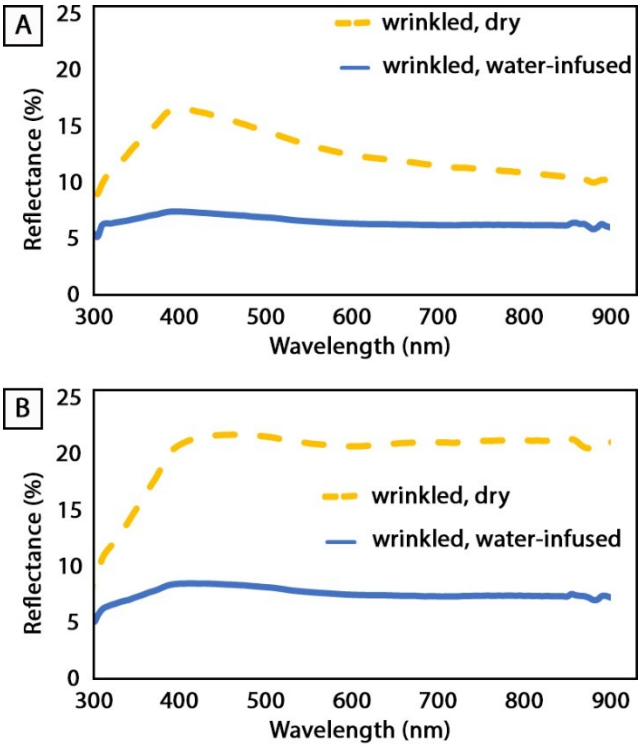


**Fig. S3.** Reflectance of dry and infused wrinkled P4VP films on top of transparent Polyshrink substrates (A) 36 nm-thick P4VP film, and (B) 241 nm-thick P4VP film.