# Electronic Supplementary Information (ESI)

# Enhancement of icephobic properties based on UV-curable fluorosilicone copolymer films

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**Table S1** Compositions of UV-curable films containing fluorosilicone copolymers.

| Sample | PDMS-SH (g) | OVPOSS (g) | PDMS-*b*-(PFMA-SH)$_2$ (g) |
|---|---|---|---|
| **F0%** | 1.0 | 0.1 | - |
| **12F1%** | 1.0 | 0.1 | 0.01 |
| **12F3%** | 1.0 | 0.1 | 0.03 |
| **12F5%** | 1.0 | 0.1 | 0.05 |
| **12F10%** | 1.0 | 0.1 | 0.1 |
| **12F20%** | 1.0 | 0.1 | 0.2 |
| **12F30%** | 1.0 | 0.1 | 0.3 |
| **12F40%** | 1.0 | 0.1 | 0.4 |
| **12F50%** | 1.0 | 0.1 | 0.5 |
| **12F60%** | 1.0 | 0.1 | 0.6 |
| **17F1%** | 1.0 | 0.1 | 0.01 |
| **17F3%** | 1.0 | 0.1 | 0.03 |
| **17F5%** | 1.0 | 0.1 | 0.05 |
| **17F10%** | 1.0 | 0.1 | 0.1 |
| **17F20%** | 1.0 | 0.1 | 0.2 |
| **17F30%** | 1.0 | 0.1 | 0.3 |
| **17F40%** | 1.0 | 0.1 | 0.4 |
| **17F50%** | 1.0 | 0.1 | 0.5 |
| **17F60%** | 1.0 | 0.1 | 0.6 |

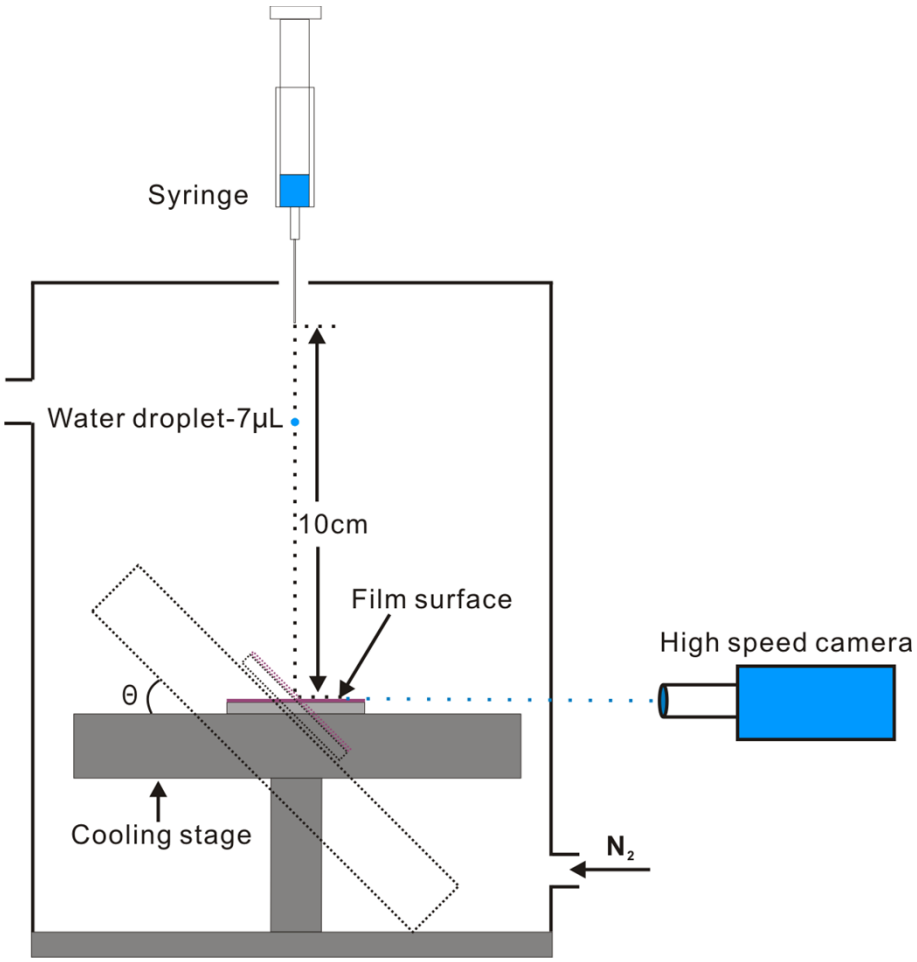


**Fig. S1** Schematic diagram of water droplets dropping on the sample surface.

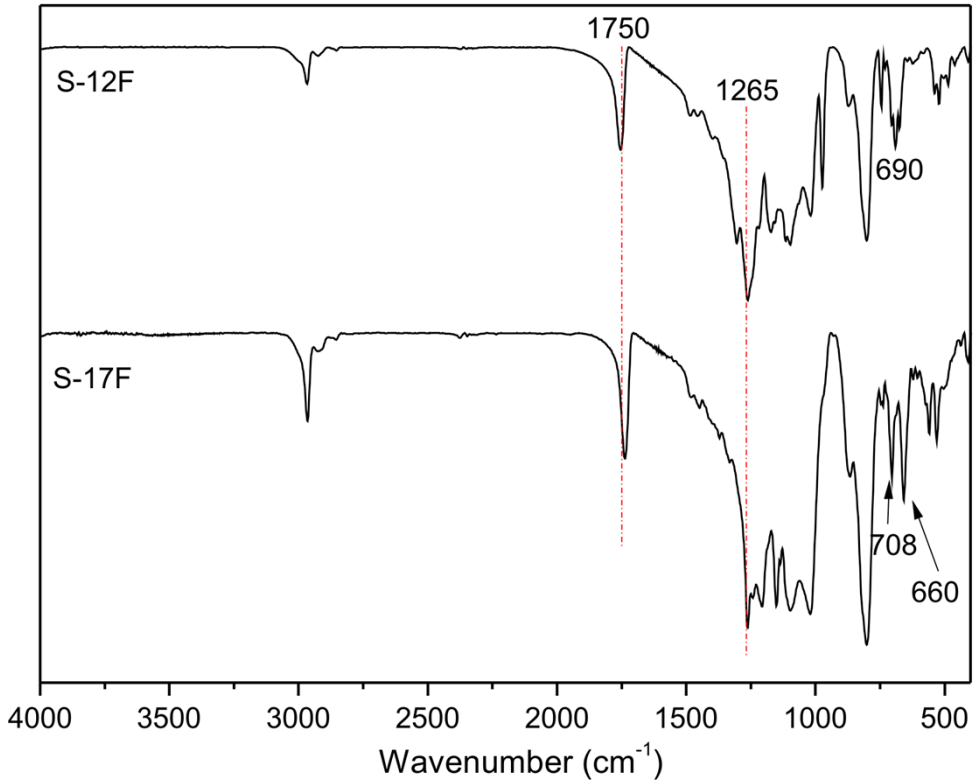


**Fig. S2** FT-IR spectra of the prepared **S-12F** and **S-17F** block copolymers. The peak at 1750 $cm^{-1}$ was assigned to C=O stretching vibration. The absorbances at 1265 $cm^{-1}$ and 1010~1120 $cm^{-1}$ were attributed to the Si-$CH_3$ stretching vibration and Si-O-Si asymmetric stretching vibration, respectively, which were characteristic signals of PDMS. The absorption peaks at 690 $cm^{-1}$ for wagging vibrations of C–F bonds was observed in the spectra of **S-12F**. For **S-17F**, the absorbances at 660 $cm^{-1}$ and 708 $cm^{-1}$ were attributed to the rocking and wagging vibrations of $CF_2$ groups.

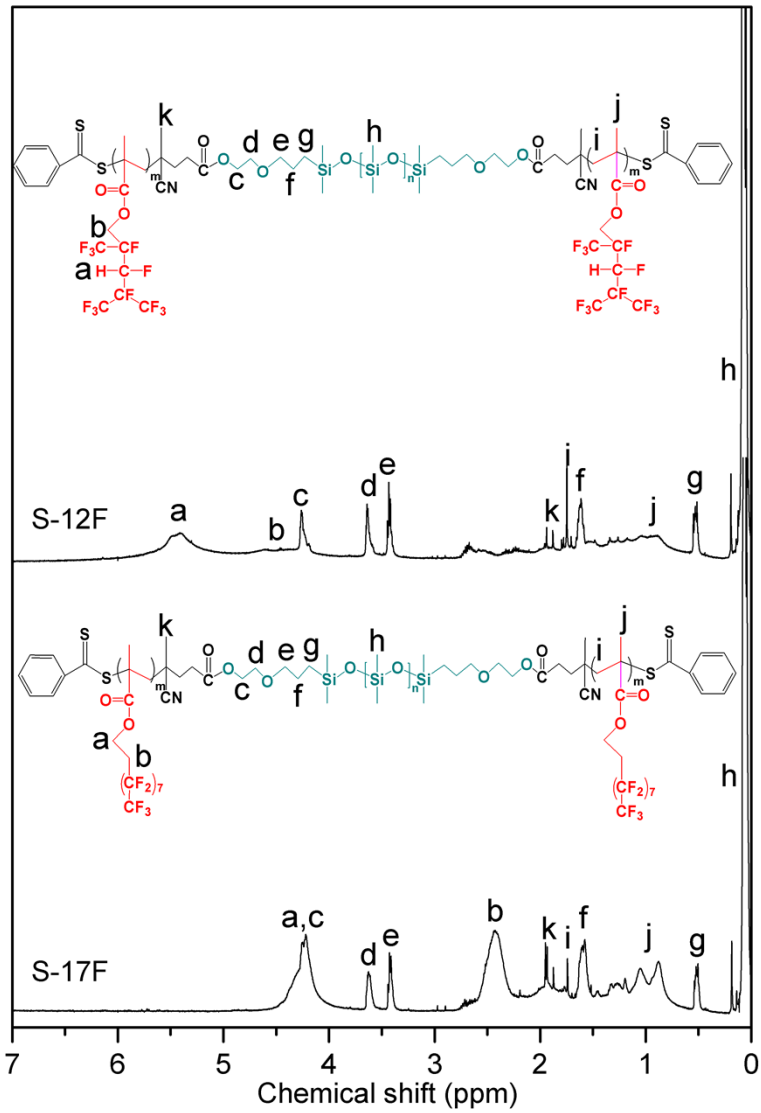


**Fig. S3** $^{1}$H NMR spectra of the prepared **S-12F** and **S-17F** block copolymers. The signals of $\delta_H$ in PDMS block were observed at 0.1 ppm for the -Si–$CH_3$ group. The characteristic $\delta_H$ signals of -O-C$\underline{H}_2$-$CH_2$-O-C=O and -$CH_2$C$\underline{H}_2$O$CH_2$- groups next to PDMS block were found at 3.6 ppm and 3.4 ppm, respectively, indicating successful esterification of CPADB with HO-PDMS-OH. The typical $\delta_H$ in P12FMA block were observed at 5.2–6.6 ppm and 4.2–4.6 ppm for –C$\underline{H}$F and -C$\underline{H}_2$-$CFCF_3$- groups correspondingly in the spectra of **S-12F**. The signals of $\delta_H$ at 4.0–4.5 ppm and 2.2–2.6 ppm in the spectra of **S-17F** were assigned to -$\underline{CH}_2$-O- and -C$\underline{H}_2$-$CF_2$- groups in P17FMA block, respectively.

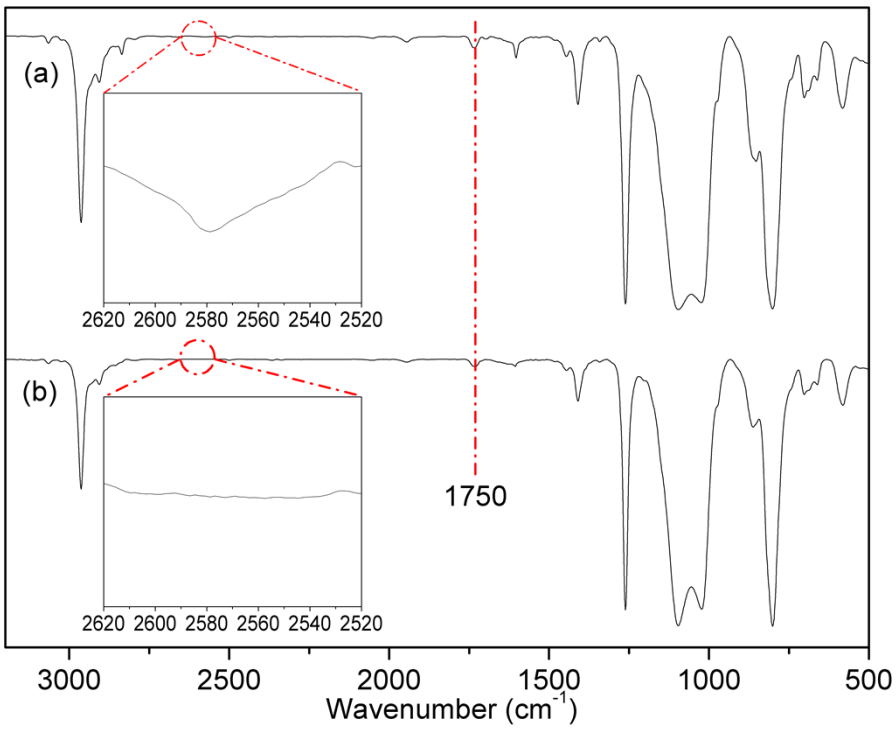


**Fig. S4** FT-IR spectra of the **17F10%** film (a) before and (b) after UV curing, suggesting absorbance changes of the thiol group. The absorbance at 1750 $cm^{-1}$ was attributed to the C=O stretching vibration belong to **S-17F**. The absorbance at 2580 $cm^{-1}$, associated with the S–H group, disappeared after UV curing, indicating that the S–H group had reacted during the photo-curing polymerization.

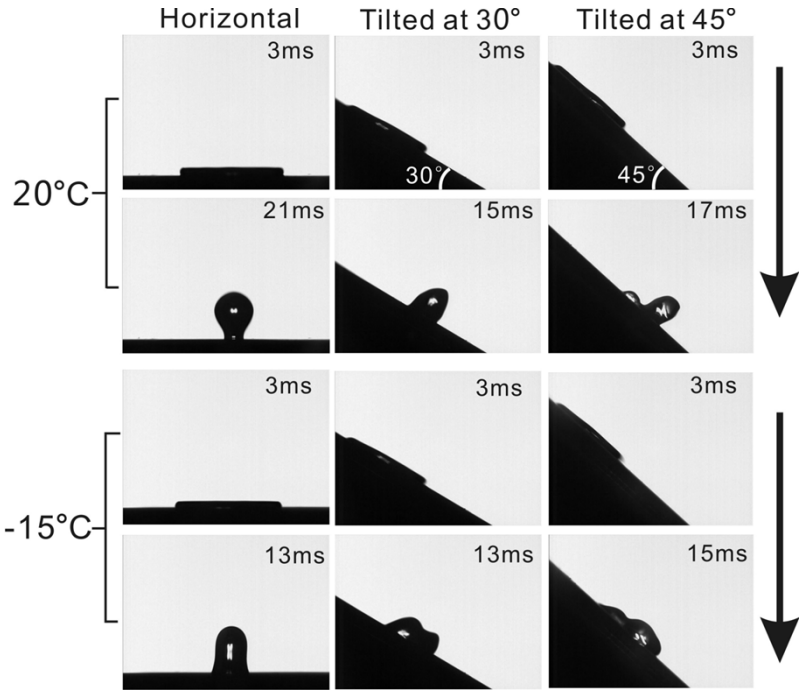


**Fig. S5** High speed digital camera images of the dynamic behavior of 7-μL water droplets dropping on the horizontal and tilted (30°, 45°) **12F50%** surface from a 10 cm height at 20°C and -15°C, respectively.

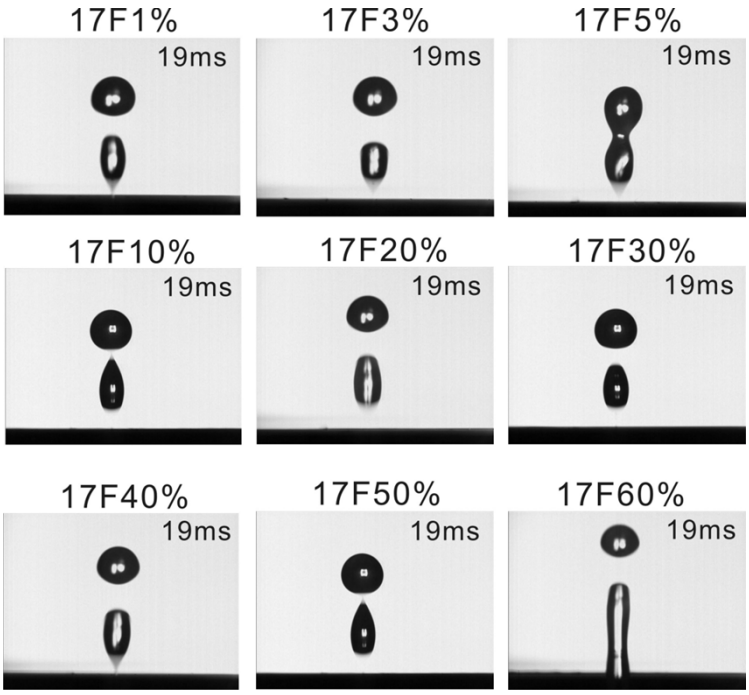


**Fig. S6** High speed digital camera images of the dynamic behavior of 7-μL water droplets dropping on the horizontal P17FMA-containing UV-curable film surfaces from a 10 cm height at -15°C.

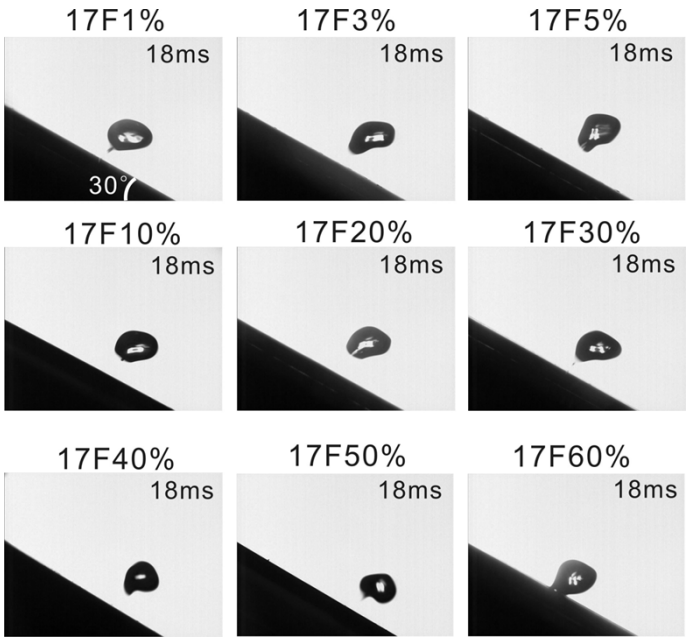


**Fig. S7** High speed digital camera images of the dynamic behavior of 7-μL water droplets dropping on the 30° tilted P17FMA-containing UV-curable film surfaces from a 10 cm height at -15°C.

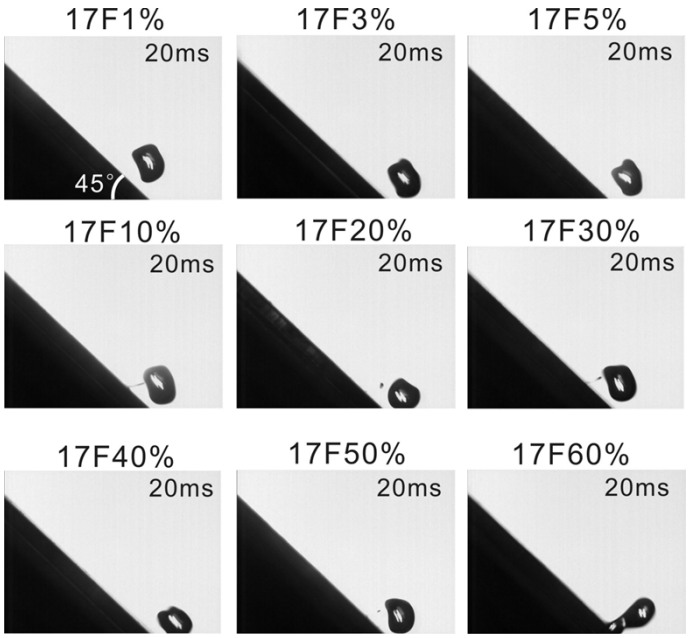


**Fig. S8** High speed digital camera images of the dynamic behavior of 7-μL water droplets dropping on the 45° tilted P17FMA-containing UV-curable film surfaces from a 10 cm height at -15°C.