Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Fabrication of Micro-Nanostructured Superhydrophobic Aluminum Surface with Excellent Corrosion Resistance and Anti-Icing Performance

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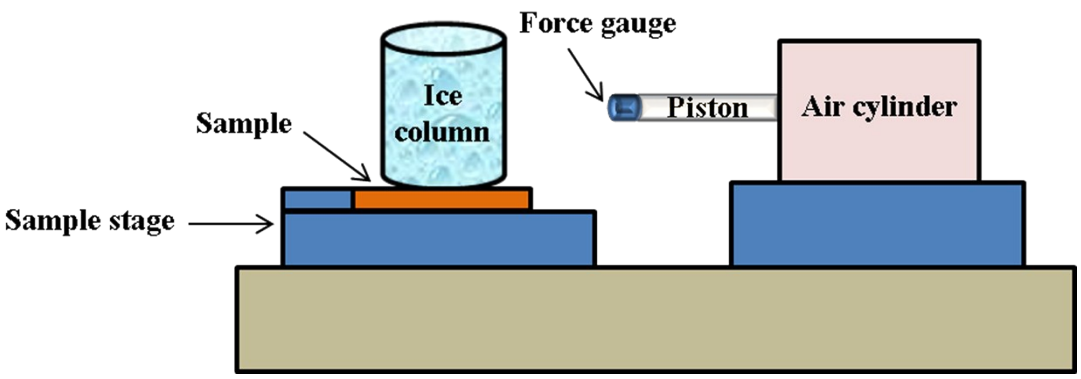

Fig. S1. Schematic of a self-designed ice adhesion device.

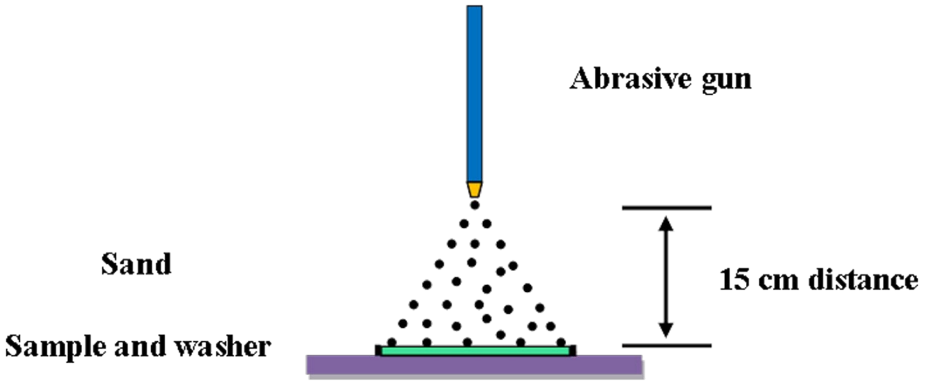

Fig. S2. Schematic of the micro-sandblast test.

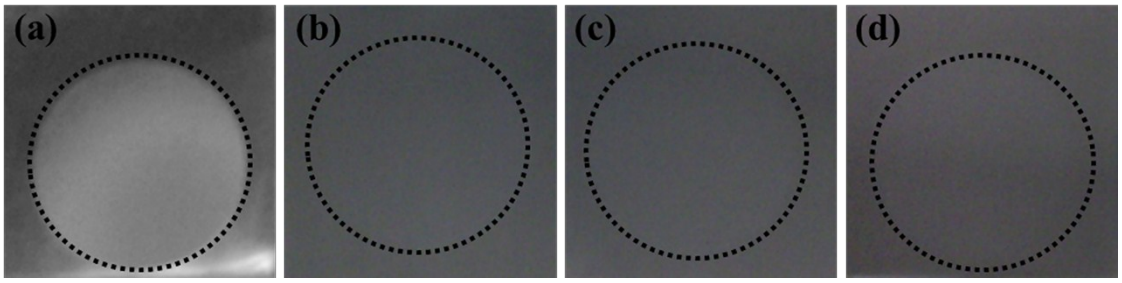

Fig. S3. The change after micro-sandblast test for various time. Al surface modified by FAS: (a) 30 s; SHS: (b) 30 s; (c) 60 s; (d) 90 s. The parts inside the O-ring are treated by micro-sand erosion. There is obvious color difference between the inside and outside of the O-ring part on the Al surface modified by FAS after micro-sandblasting for 30 s while there is no significant change even after micro-sandblasting for 90 s on the SHS.

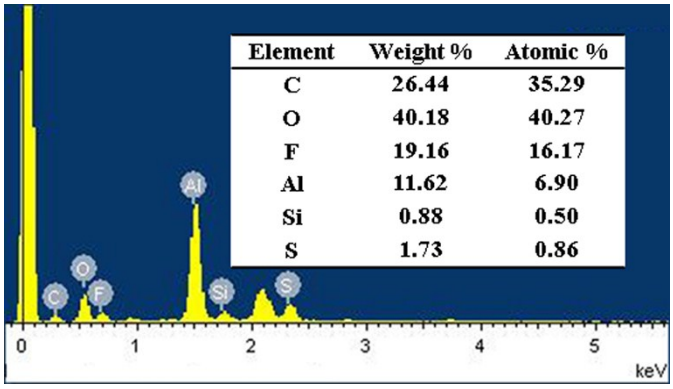

Fig. S4. EDS spectra of SHS after weathering resistance test.

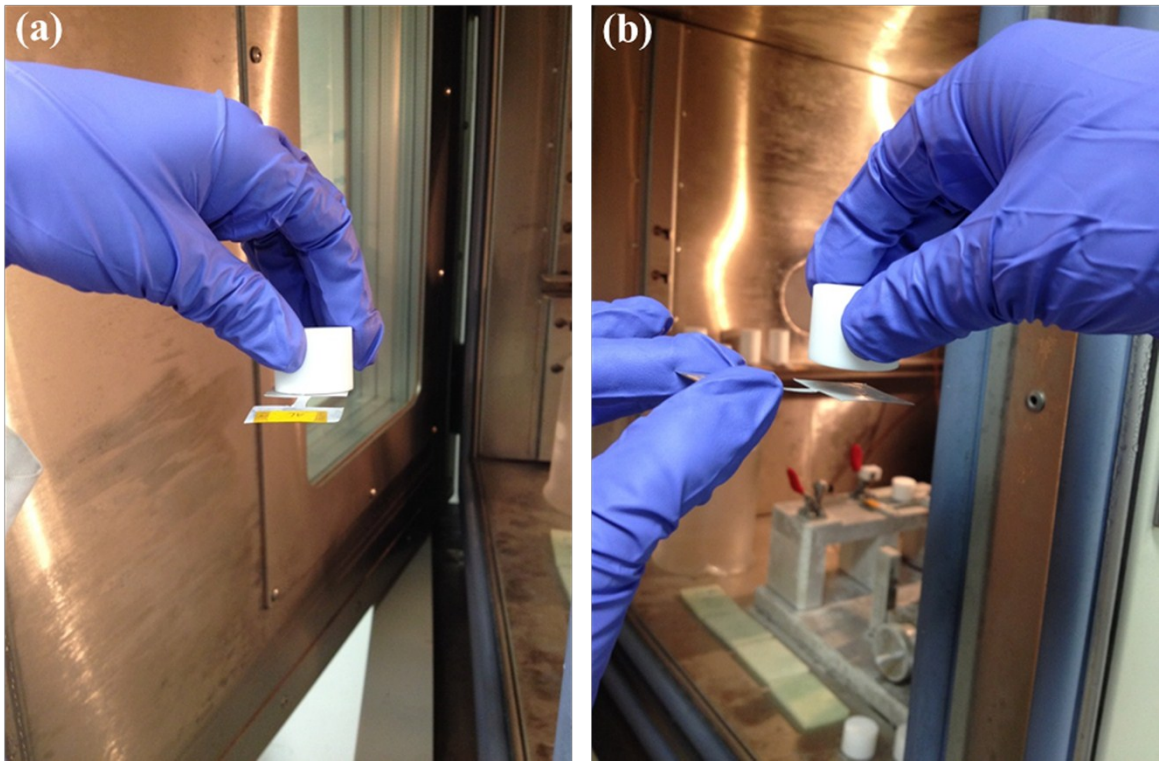

Fig. S5. The samples after being kept at −10 °C for 24 h in the ice chamber and taken out immediately: (a) Al surface; (b) SHS.

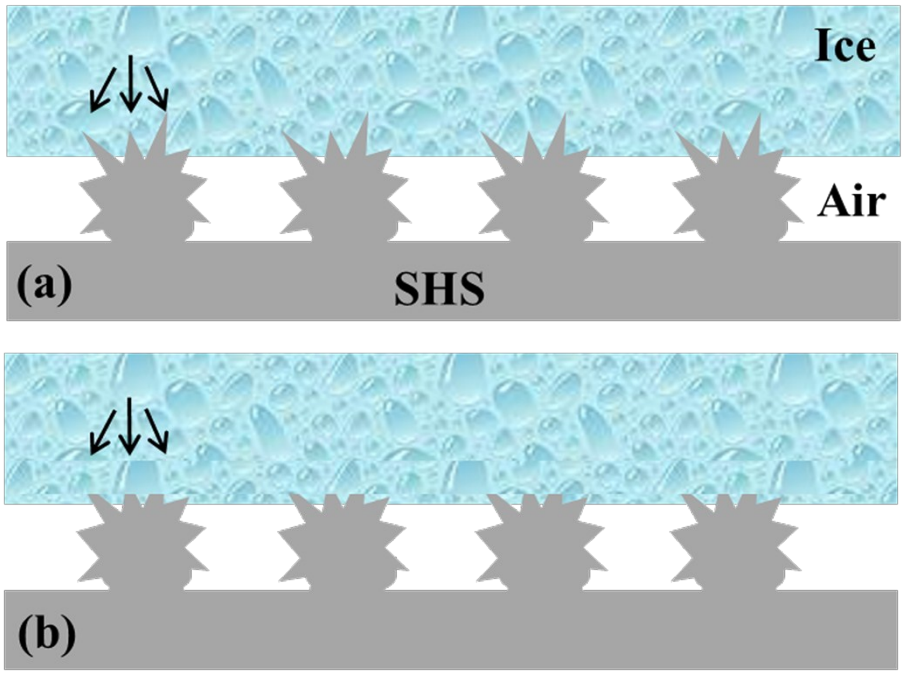

Fig. S6. Schematic illustration of the surface structure on the SHS: (a) before and (b) after repeated icing/deicing processes. The asperities with tips which are indicated by arrows are intended into the ice during the water solidication, as shown in Fig. S6(a). The damage of the tips on the asperities is caused by the icing/deicing processes, as shown in Fig. S6(b). The surface structure of SHS is increasingly damaged during repetitive icing/deicing tests from S6(a) to S6(b). However, the micro-nano hierarchical structure largely survives.

Table S1 Lightness values of the samples before and after immersion in the artificial dirty solution.

Samples	L_1	L_2	$L_1 - L_2$	$(L_1 - L_2) / L_1 \times 100$
	Pristine sample	Contaminated sample		Dirt accumulation (%)
Al	75.61	62.86	12.75	16.86
AAO	64.93	57.54	7.39	11.38
SHS	65.81	65.69	0.12	0.18

Supporting videos:

Video S1: A water droplet of 4 μL is dripped onto the AAO surface and spreads all over the surface, indicating its superhydrophilicity.

Video S2: The water droplets of 10 μL can roll away easily after dripped onto the SHS.

Video S3: The SHS shows the surface has an extremely low water adhesion after repeated icing/deicing processes.