

Supplementary Information

Slippery Mush-Infused Surfaces with Effective and Durable Anti-Icing and Water Harvesting Performance

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Figure S1 shows the second approach of the fabrication process of PCSIS, using spraying. In this process, Carnauba wax and ethanol are magnetically stirred for an hour at 120 °C. Then this solution is placed in an ultrasonic bath for two hours to become uniform. Thereafter, the solution is sprayed onto the prepared anodized aluminum surface from a 20 cm distance by means of an air compressor pressure of eight bar. Afterwards, the coated surface is hanged vertically in an oven with the temperature of 100 °C.

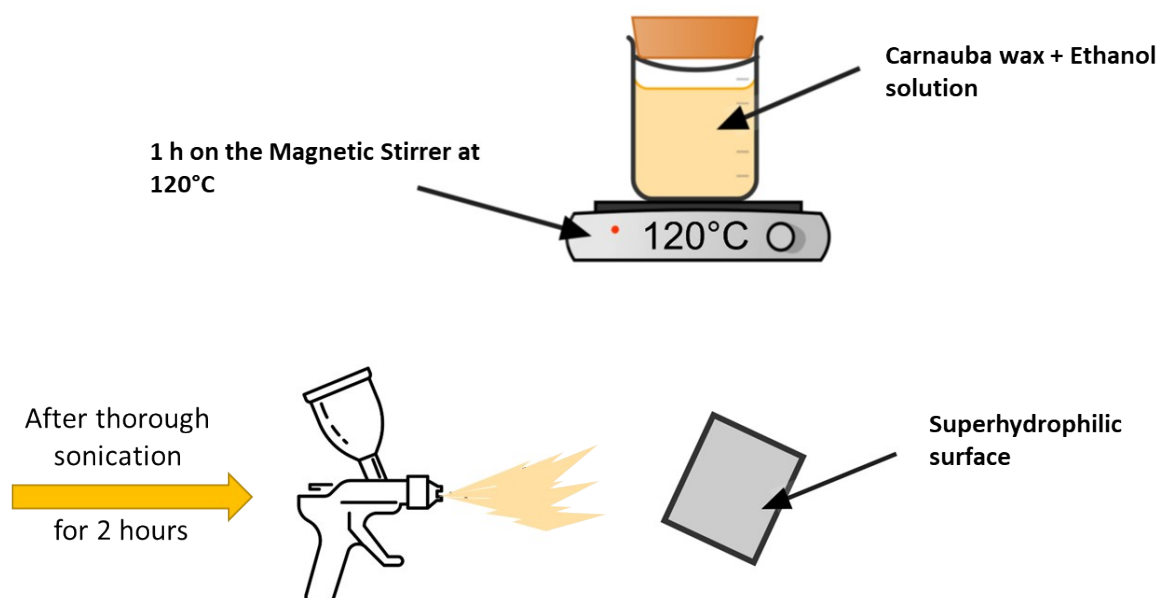


Figure S1. Schematics of PCSIS fabrication through spraying of Carnauba wax and ethanol solution on anodized aluminum.

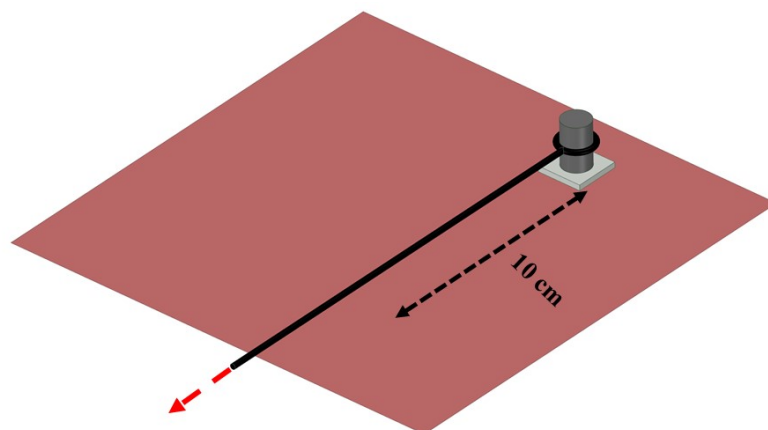


Figure S2. Schematics of the abrasion test encompassing a 100 g weight attached to the back of the coated surface pulled across a #400 sandpaper.

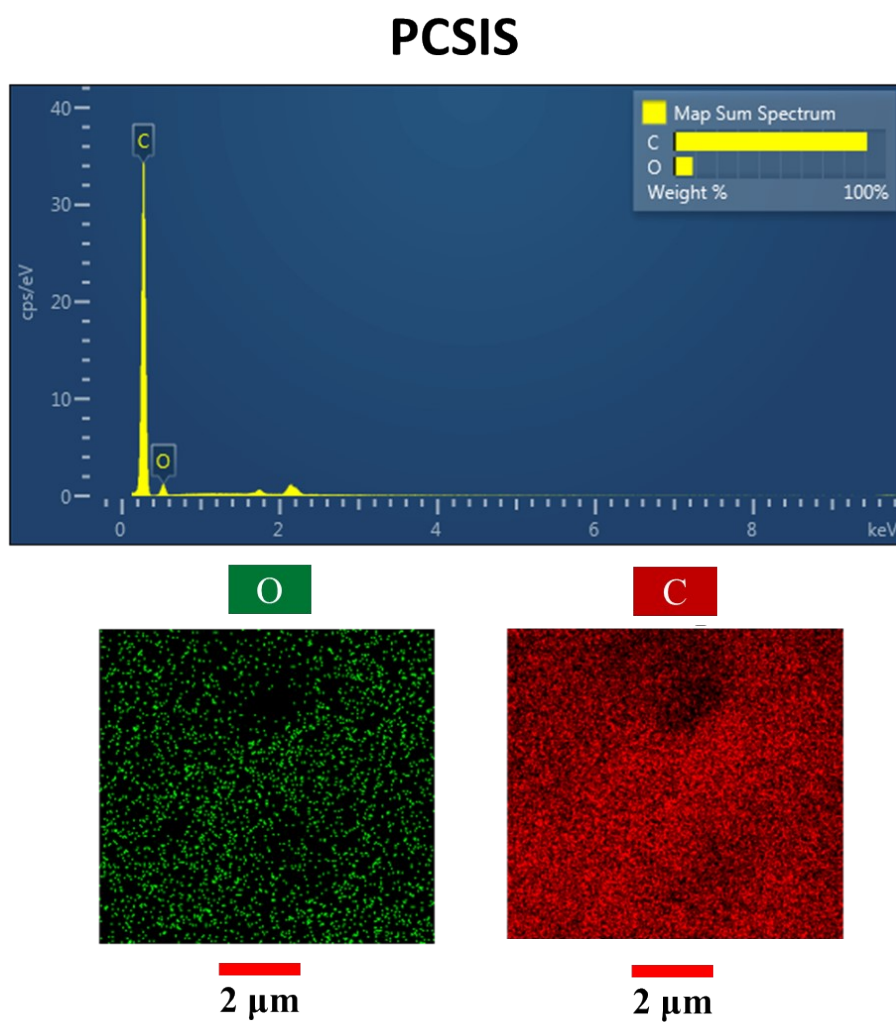


Figure S3. EDS results for PCSIS, including the Map sum Spectrum analysis of the scanned PCSIS sample along with separate EDS maps for oxygen and carbon atoms on the surface.

Figure S2 illustrates the schematics of the abrasion test, performed by dragging the sample attached to a 100 g weight over a #400 sandpaper.^{1,2} In each cycle of this test, the sample was pulled across a 100 mm distance on the sandpaper.

Figure S3 the EDS results for the PCSIS, which is essentially anodized aluminum that is infused with Carnauba wax. As such, the resulting maps show carbon and oxygen that are elements present in the Carnauba wax but no aluminum atoms are shown in the maps, which is due to high coating thickness. Figure S4 and Figure S5 respectively show the EDS results for the SLIPS and the SMIS. Accordingly, EDS maps of both specimens exhibit aluminum, carbon, oxygen, and silicon elements on the surface. The presence of aluminum elements in the EDS maps of the SLIPS the SMIS while there is no aluminum is the EDS maps of PCSIS further confirms that the PCSIS coating is thicker than the other two surfaces.

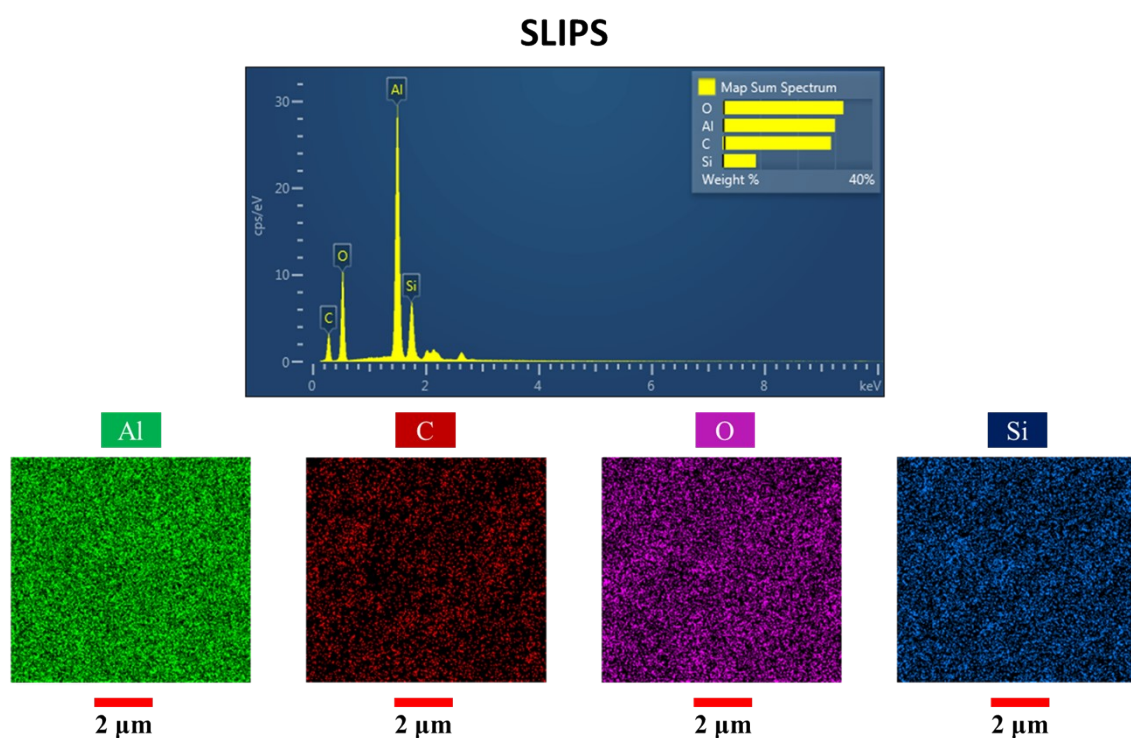


Figure S4. EDS results for SLIPS, including the Map sum Spectrum analysis of the scanned SLIPS sample along with separate EDS maps for aluminum, carbon, oxygen, and silicon atoms on the surface.

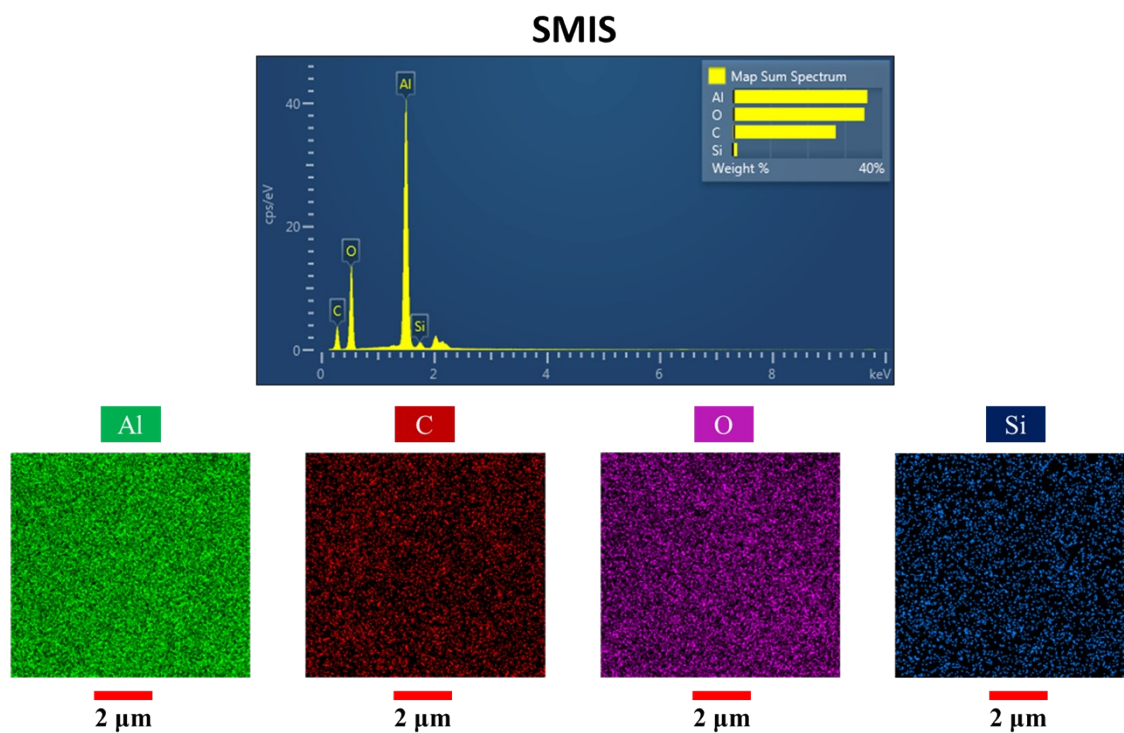


Figure S5. EDS results for SMIS, including the Map sum Spectrum analysis of the scanned SMIS sample along with separate EDS maps for aluminum, carbon, oxygen, and silicon atoms on the surface.

References

- 1 L. Zhang, A. G. Zhou, B. R. Sun, K. S. Chen and H.-Z. Yu, *Nat Commun*, 2021, **12**, 982.
- 2 M. M. Taheri, B. Rezaee, H. Pakzad and A. Moosavi, *J Mater Chem A Mater*, 2024, **12**, 27327–27339.