Supporting Information for

A Super-Strong Hydrophobic Coating by Conducting A New 3D Hierarchical Architecture

Yong Seok Kim, Mingwei Shang, Shuai Kang, Jacob John Karsseboom, and Junjie Niu*

Supporting Information

Figures S1-2

Table S1

Movies S1-3

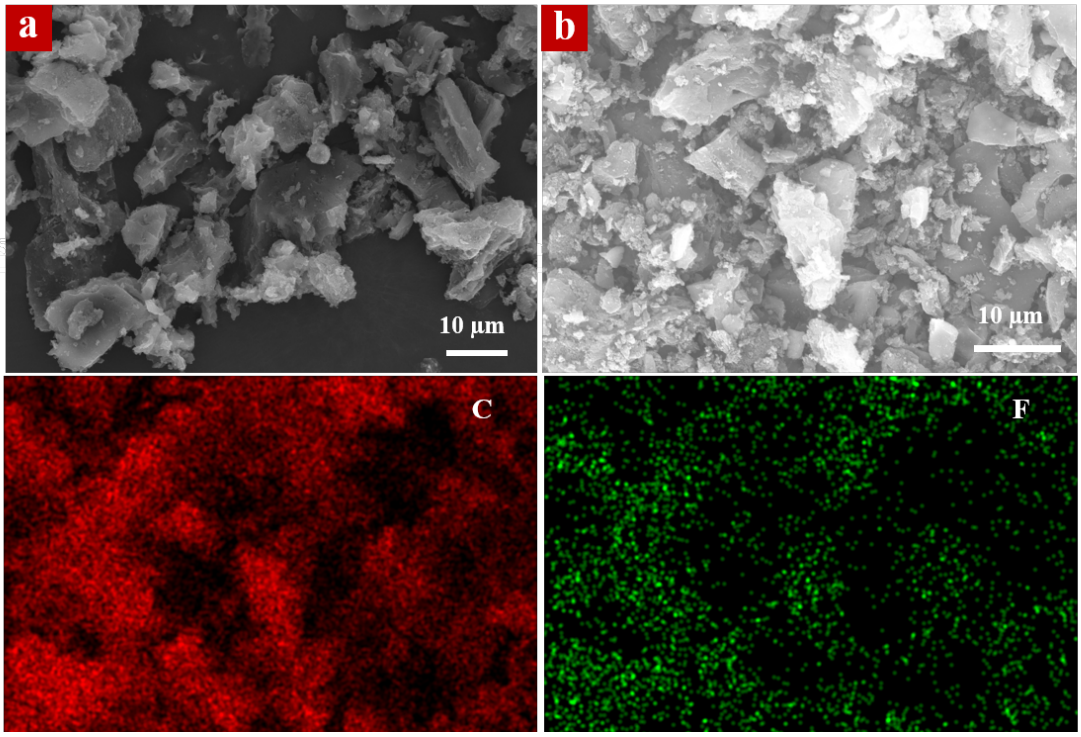

Figure S1. (a) SEM image of the original ACs. (b) The C and F elemental mappings of *f*-ACs using EDX.

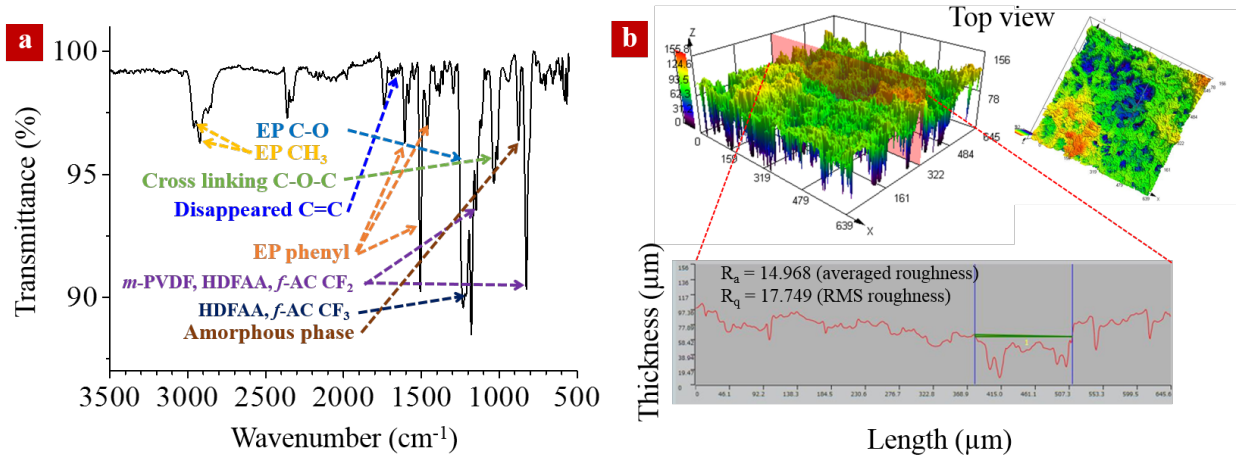

Figure S2. (a) FTIR spectrum of the 3D hybrid composite. (b) 3D laser micro-confocal microscopy image of the hybrid composite self-cleaning coating with surface profile.

Table S1 Comparison of Hydrophobic Coatings.

Samples	Method	Contact angle	Mechanical Stability	Chemical/mechanical stability	Scalable or not	Transparency	Application	Reference
PTFE coated carbon nanotubes	Plasma enhanced chemical vapor deposition	170°	N/A	N/A	No	No	Fillers for nanocomposites and single strand conductors in molecular electronics	1
TiO_2	Painting	168°	Sandpaper abrasion test (#240, 40 cycles)	N/A	Yes	No	Clothes, paper, glass, and steel for self-cleaning applications	2
Particle-filled silicone rubber composites	Drop casting	164.9°±2.2°	Sandpaper abrasion test (#400, 32.5kpa, 50cycles)	N/A	Yes	Semi-transparent	Self-cleaning	3
Nanoflower like gold	Chemical deposition	169°	Sandpaper abrasion test (#400, 30kpa, 2m)	pH=2,7 and 9	No	No	Anti-corrosion, self-cleaning, and mechanical durability	4
ZnO-polydimethylsiloxane	Chemical bath deposition	160°	Sandpaper abrasion test (45kpa, 300cycles); accelerate	CA kept 148°-168° when immersed in solution with pH from 1 to 13, for 24, 48 and 72h,	Yes	No	Self-cleaning and water oil separation	5
CuO	Electrodeposition and chemical oxidation	160°	CA≥150° after stored in air for 6 month	CA≥150° when pH from 1 to 10	Yes	Yes	Self-cleaning	6
Current work	Flexible with scalable methods	160-168°	Sandpaper abrasion test (26.1kpa, 50 cycles)	High CA at pH=2,7 and 9	Yes	Yes	Most of self-cleaning substrates such as metal, glass and plastic	

Movie S1. Water droplet dances on the 3D composite coated glass.

Movie S2. Water droplet rolls off on the AC hybrid composite coated glass with a tilt angle of 1^{o}.

Movie S3. Water droplet rolls off on the SiO_2 hybrid composite coated glass with a tilt angle of 1^{o}.

Reference

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