Supplementary Information

Multi-Functional Fluorinated Ionic Liquid Infused Slippery Surfaces with Dual-Responsive Wettability Switching and Self-Repairing

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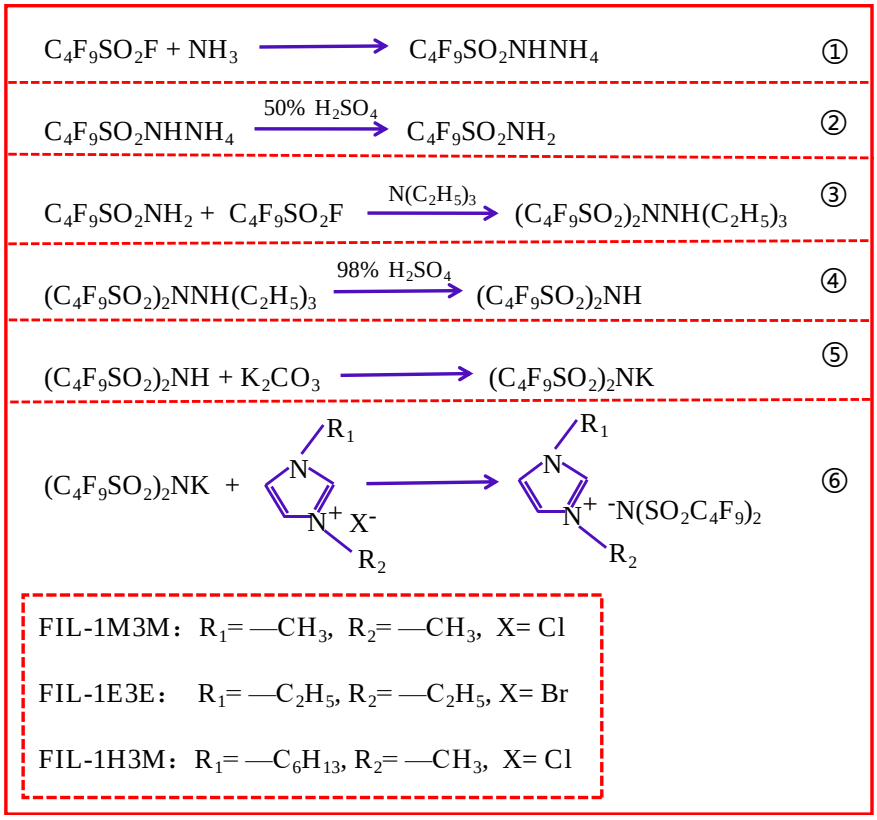

Scheme S1. Synthesis process of FIL-1M3M、FIL-1E3E、FIL-1H3M.

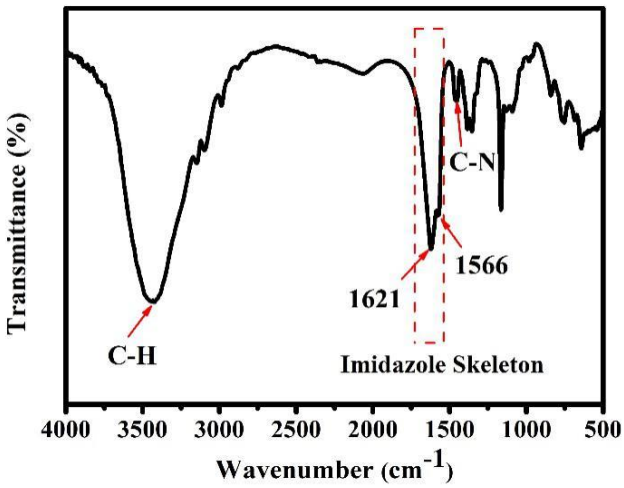

Fig.S1 FT-IR spectra of [EEIm] Br.

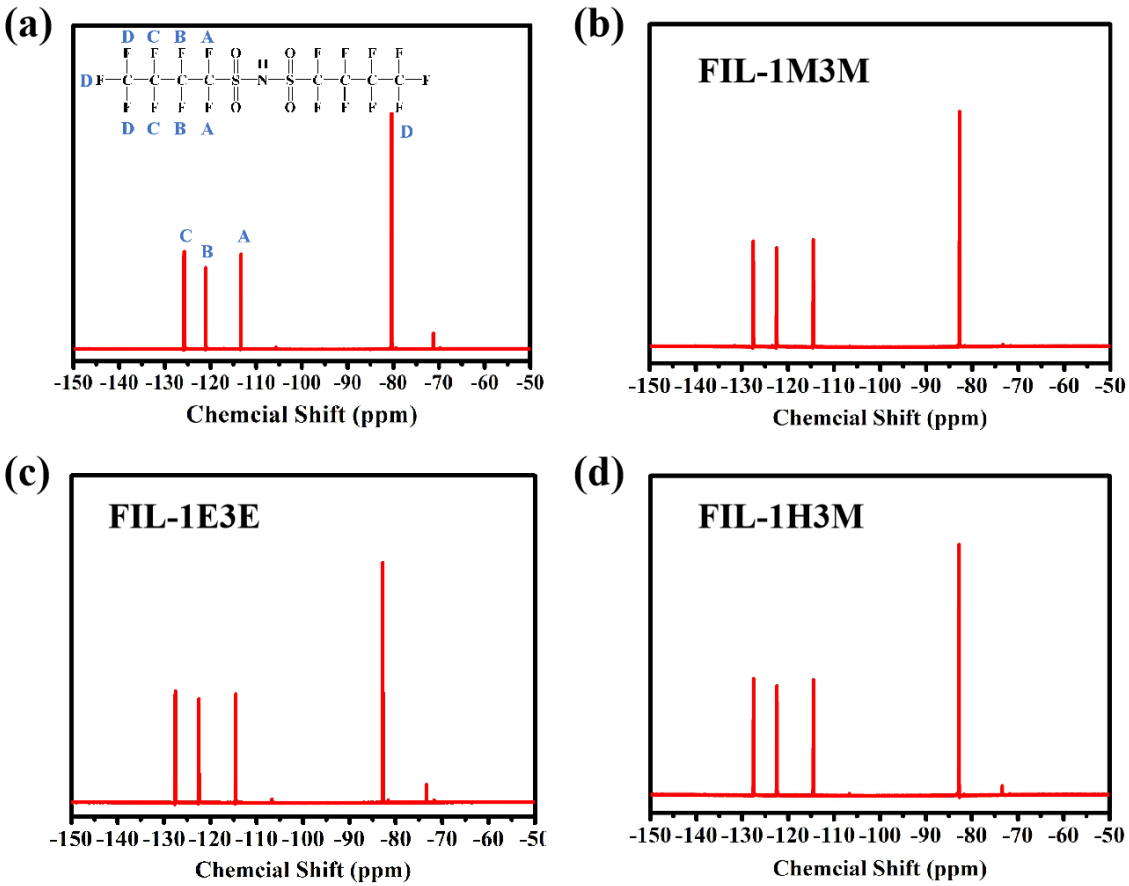

Fig.S2 ^{19}F NMR spectra of $(C_4F_9SO_2)_2NH$ (a)、FIL-1M3M (b)、FIL-1E3E (c)、FIL-1H3M (d).

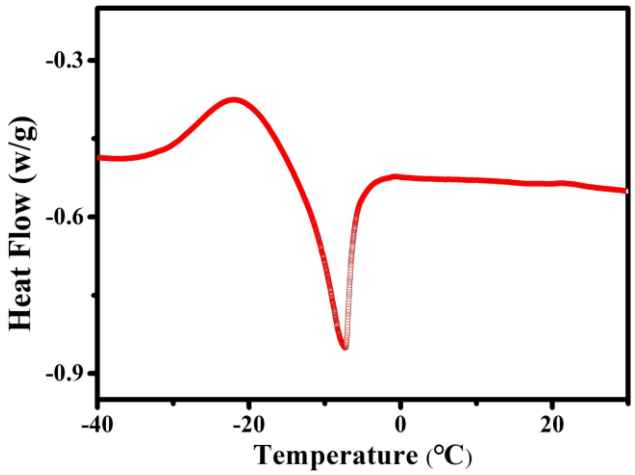

Fig.S3 DSC curves of FIL-1E3E.

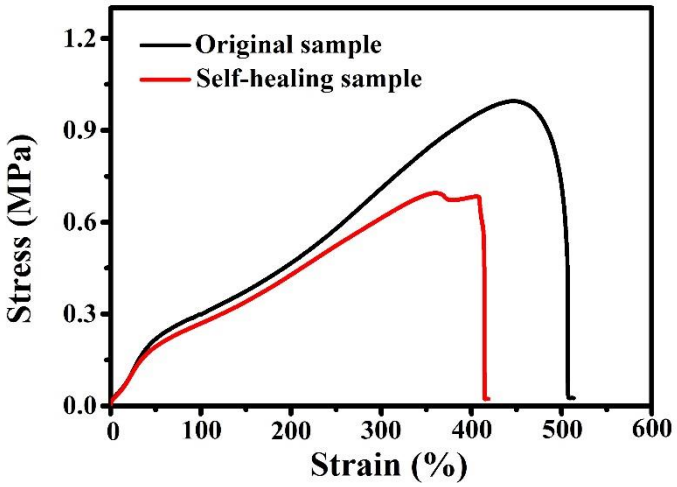

Fig.S4 Stress-strain curves of the original substrate and healed substrate.

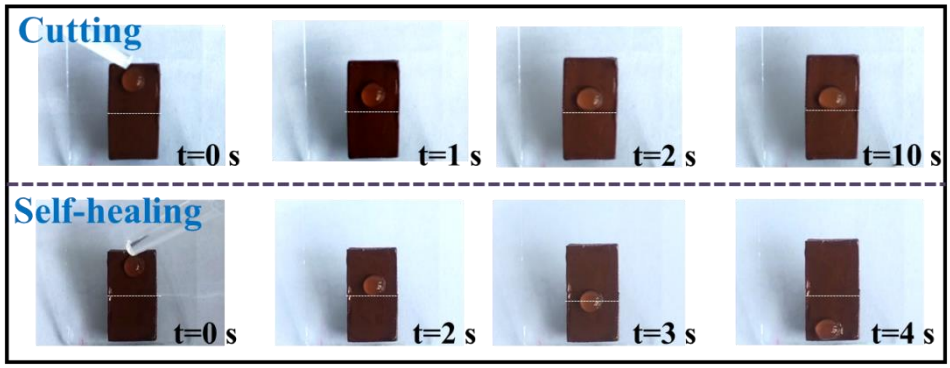

Fig.S5 The moving water droplet (20 μL) was pinned at the physical damage line on the tilted surface and moved continuously on the self-healed MPRSs-1H3M. TA: 25 °

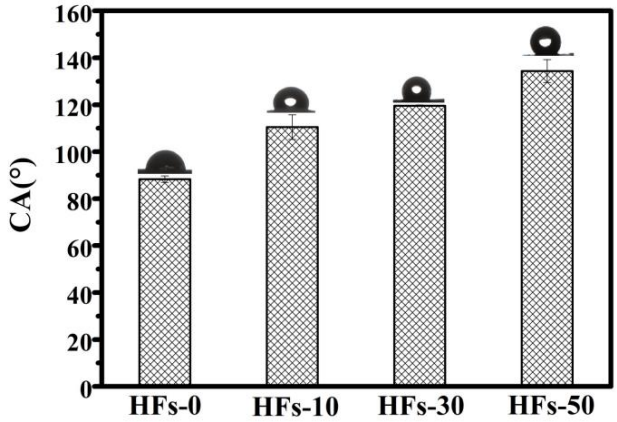

Fig.S6 The CA of HFs with different content of Fe_3O_4 nanoparticles.

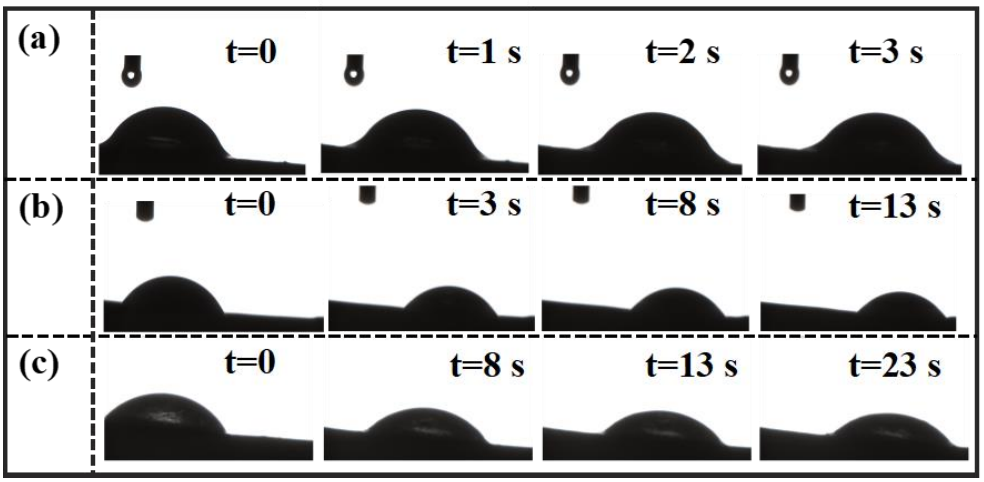

Fig.S7 Photographs showing the dynamic mobility of a water droplet (7 μL) on MPRSs-1M3M(a), MPRSs-1H3M (b) and MPRSs-1E3E (c) with a low tilting angle (~5°).

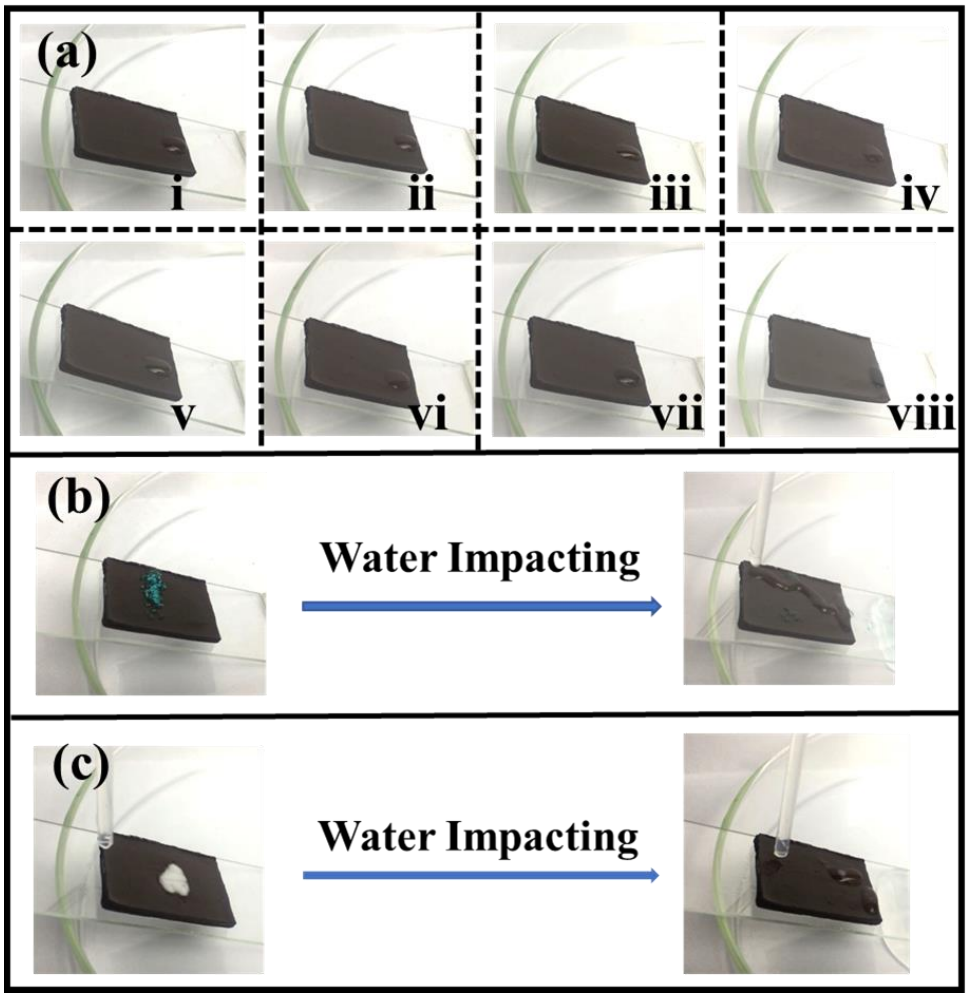

Fig.S8 (a) Snapshots of water (i), dodecane (ii), hexadecane (iii) and hexane (iv), toluene (v), coffee (vi), honey (vii), soy sauce (viii) droplets sliding down the MPRSs-1E3E, droplet volume: 20 μL. Self-cleaning tests by using $CuCl_2.2H_2O$ particles (b) and SiO_2 particles (c) on MPRSs-1E3E. TA: 25°.

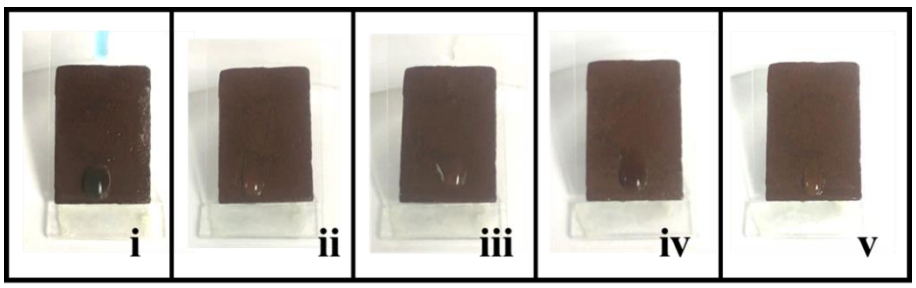

Fig.S9 Snapshots of water (i) dyed with methyl blue, hexadecane (ii), toluene (iii) and coffee (iv), honey (v), droplets sliding down the MPRSs-1E3E. Droplet volume: 20 μL, TA: 25°.

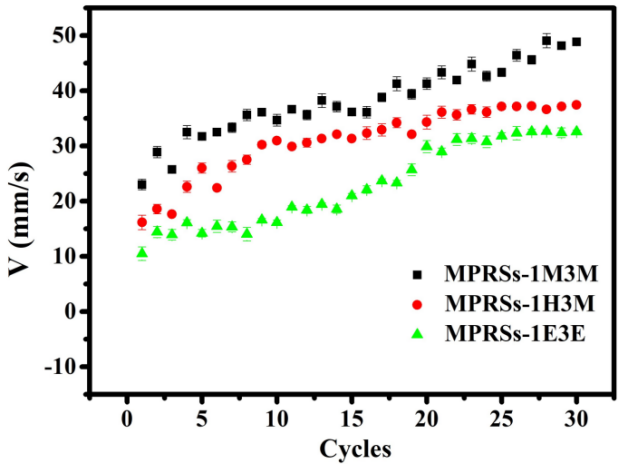

Fig.S10 Cycles of water droplet (20μL) sliding on the MPRSs (TA: 25°).

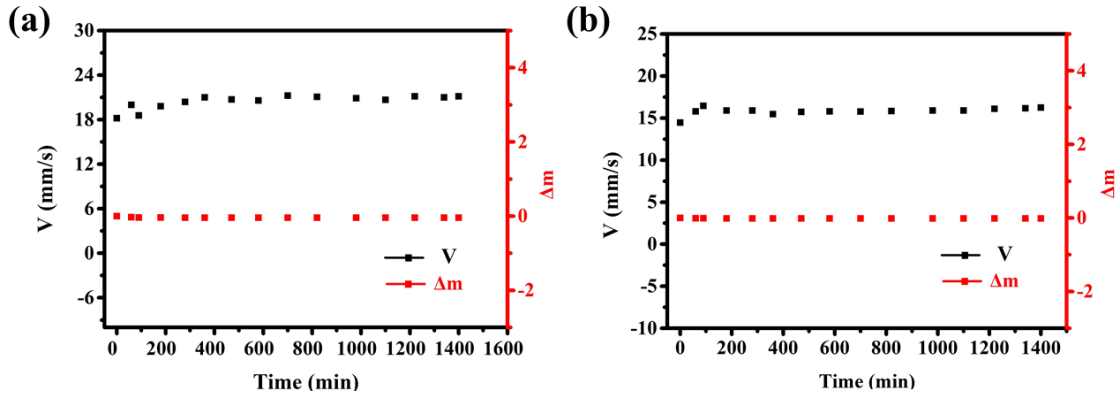

Fig.S11 The sliding velocity and mass variation of MPRSs-1H3M (a) and MPRSs-1E3E (b) when they were placed on vertical position for 1400 min. TA: 25 °， water droplet volume: 20 μl.

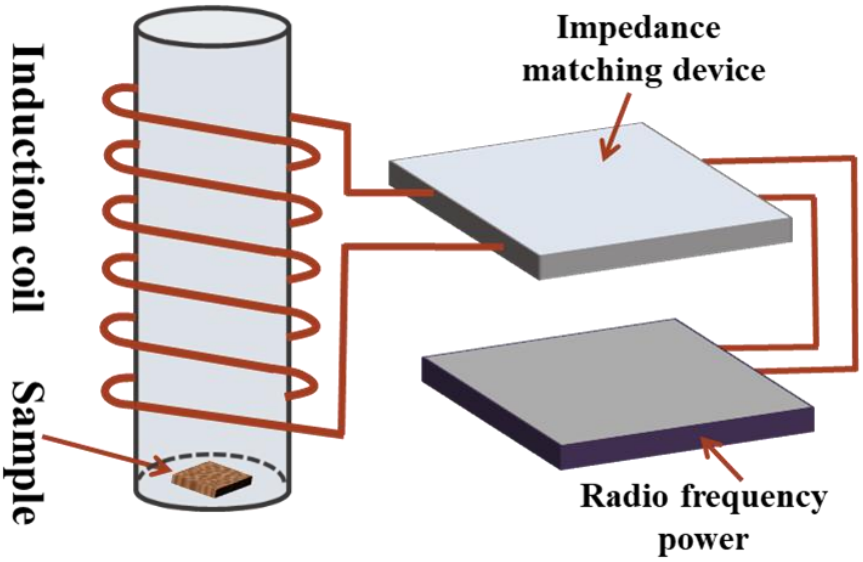

Fig.S12 Magneto-thermal experimental setup for inductively triggering heating in a magnetic field

under 450 W.

Fig.S13 Snapshots of individual water droplet on Teflon template during the whole freezing process.

Video S1: Liquid repellency property of MPRSs-1M3M.

Video S2: Liquid repellency property of MPRSs-1H3M.

Video S3: Liquid repellency property of MPRSs-1E3E.