Supporting Information

# A superamphiphobic concrete with anti-icing properties

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† Electronic Supplementary Information (ESI) available: [Fig.S1-S3 and Movie.S1-S2]. See DOI: 10.1039/x0xx00000x

#### **Experimental section**

### 1.1 Materials

Portland cement(PO42.5) was from CONCH, river sands was from Tao Bao, 1H,1H,2H,2H-perfluorodecyltrimethoxysilane(97 %) was from Mclean, absolute ethanol was from Wuhan Xin Shenshi Chemical Technology Co., Ltd. The laser marker (JN-20) used in the experiment was purchased from Zhejiang Optical Instrument Manufacturing Co. All chemicals were of analytical grade without further purification.

#### 1.2 Preparation of original concrete

Fully blend 20 g of Portland cement with 20 g of river sands (particle size less than 300  $\mu$ m), then pour 10 ml of deionized water into the previous mixture, stir them for 10 mins. After that, pour the fresh pre-concrete mixture into the Petri dishs.

## 1.3 Preparation of laser etching concrete

After the concrete is cured and demolded, a grid with a pore diameter of 120  $\mu$ m and a line width of 10  $\mu$ m is etched on its surface by a laser marking machine and the power of the laser marking machine was set to 100%, the speed was set to 500 mm/s, the frequency was set to 200 KHz, the number of processing times was set to 10.

#### 1.4 Preparation of superamphiphobic concrete

After laser etching, 200 µl of 1H,1H,2H,2H-perfluorodecyltrimethoxysilane and 20 ml of ethanol was mixed and sonicated for 30 min to form the FAS solution. The etched concrete was then immersed in the FAS solution for 2 h and dried for 24 h.



Figure S1 Schematic diagram of the preparation process of S-concrete.



Figure S2 (a)-(c) SEM images with different magnifications of dip-coating concrete. (d) – (e) SEM images with different magnifications of laser-etching concrete.



Figure S3 (a) Optical photographs of different droplets droplets added to the surface of S-Concrete after the quicksand impact. (b) Optical photographs of S-Concrete after the droplet rolls at a certain inclination angle. (c) Line chart of the number of quicksand impacts and contact angle.