

Supporting Information for:

## Self-healing mechanism of water triggered smart coating in seawater

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### S1 Microcapsule preparation

IPDI microcapsules were synthesized via in situ polymerization procedure with slight modifications<sup>1</sup>. In a typical procedure, 60 ml water and 10 ml of 3.0 wt% aqueous solution of sodium dodecyl sulfate were mixed at room temperature. Under agitation (800 RPM), 5.00 g urea, 0.60 g ammonium chloride and 0.50 g resorcinol were successively dissolved in water. 8 ml IPDI was slowly added into the mixture to form an oil in water (O/W) emulsion. After stirred for 40 min, the pH value of the emulsion was slowly adjusted to 3.50 by drop-wise addition of sodium hydroxide and hydrochloric acid. One to two drops of 1-octanol were added to eliminate surface bubbles. Then, 12.00 g of a 37 wt% aqueous solution of formaldehyde was added. The temperature was raised to 60 °C at a rate of 1 °C min<sup>-1</sup>. After 2 h of continuous agitation the mixer and the polymerized microcapsules were obtained (Figure 1a), they were repeatedly washed with ethanol and water to remove impurities.

### S2 Plasma treatment

16% IPDI microcapsules were treated with oxygen plasma (radio frequency of 13.56 MHz) at a power of 100 W and a pressure of 250 mTorr for 4 min. Oxygen was introduced to the plasma chamber at a flow rate of 5 mL min<sup>-1</sup> for the pre-treatment procedure. The IPDI microcapsule surfaces, now modified by hydroxyl, carboxyl, and carbonyl groups, were easily dispersed into AVC.