

## Supplementary Information

### **A novel capsule-based self-recovery system with chloride ions trigger**

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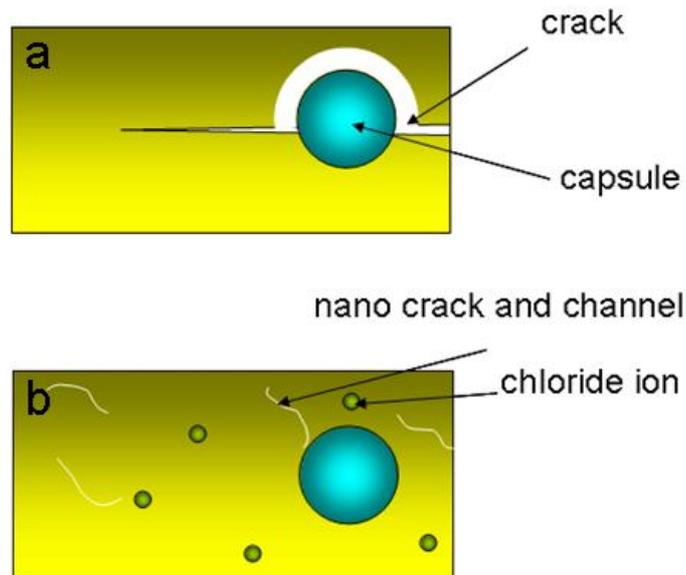
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### **Movies**

*Movie S1:* Chloride ions triggering process.

*Movie S2:* X-ray CT 3D modeling of original concrete matrix embedded with Ag-alg capsules.

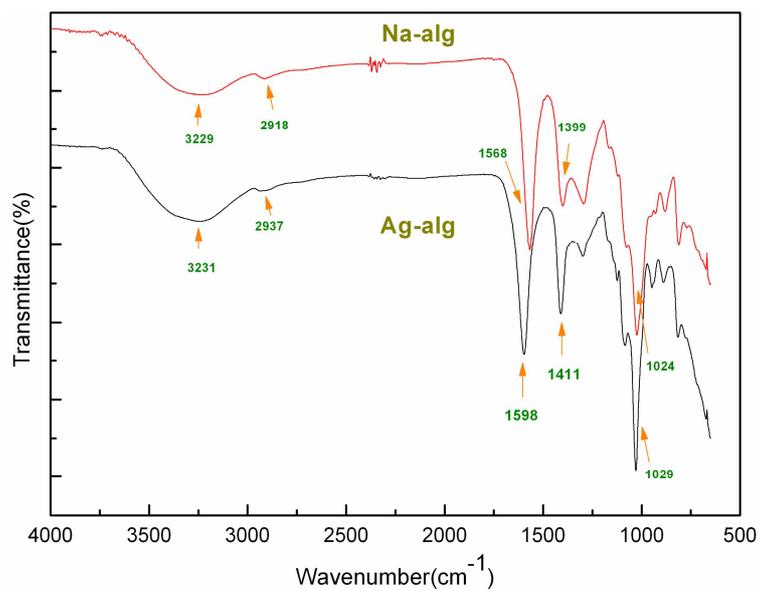
*Movie S3:* X-ray CT 3D modeling of the concrete matrix soaked into NaCl solution.



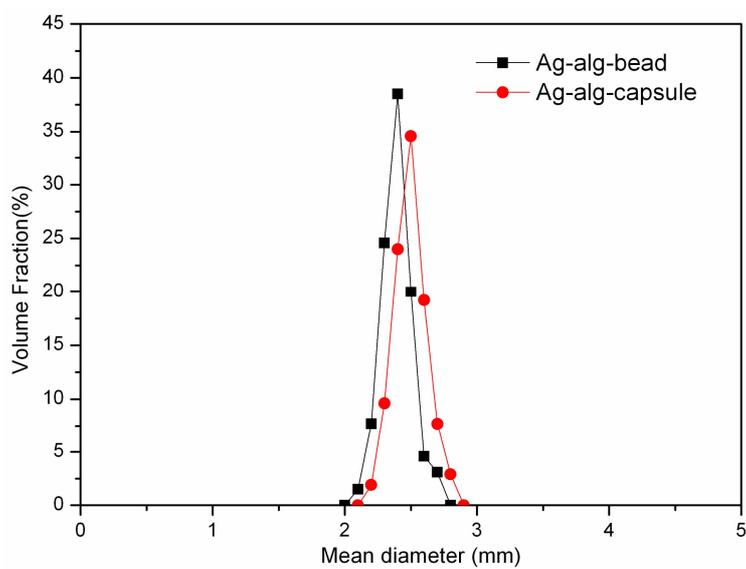
**Figure S1.** The disadvantages of current healing technology



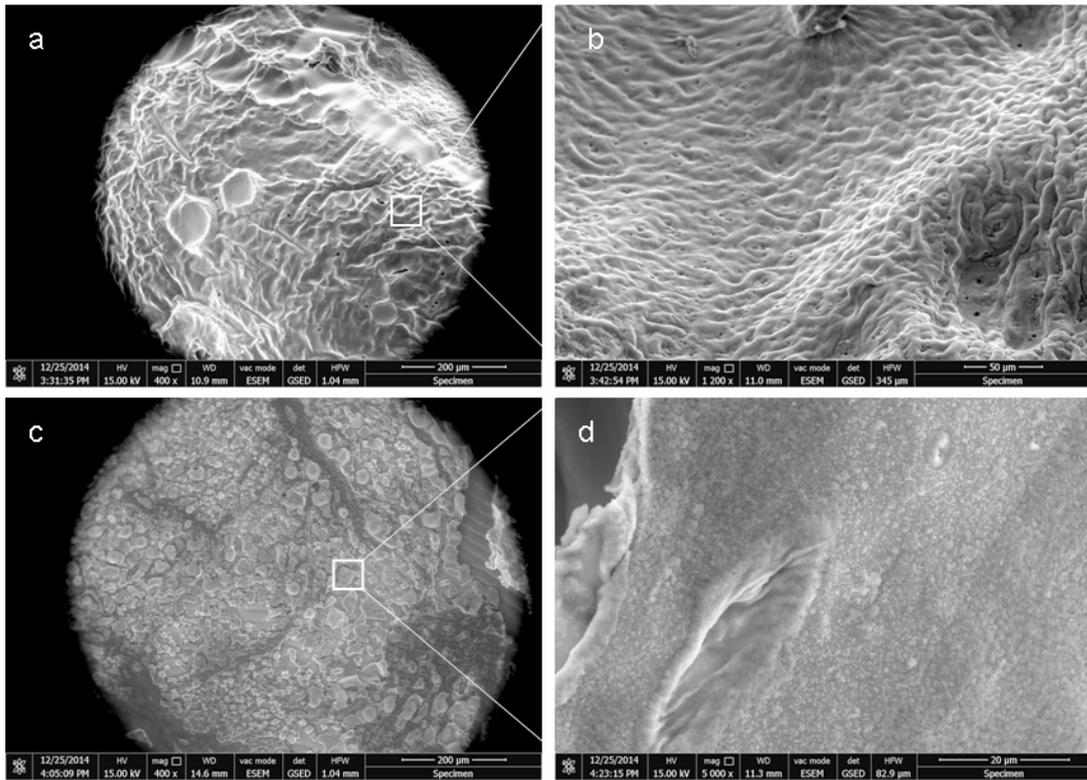
**Figure S2.** Schematic of Ag-alginate capsules encapsulated oil cores.



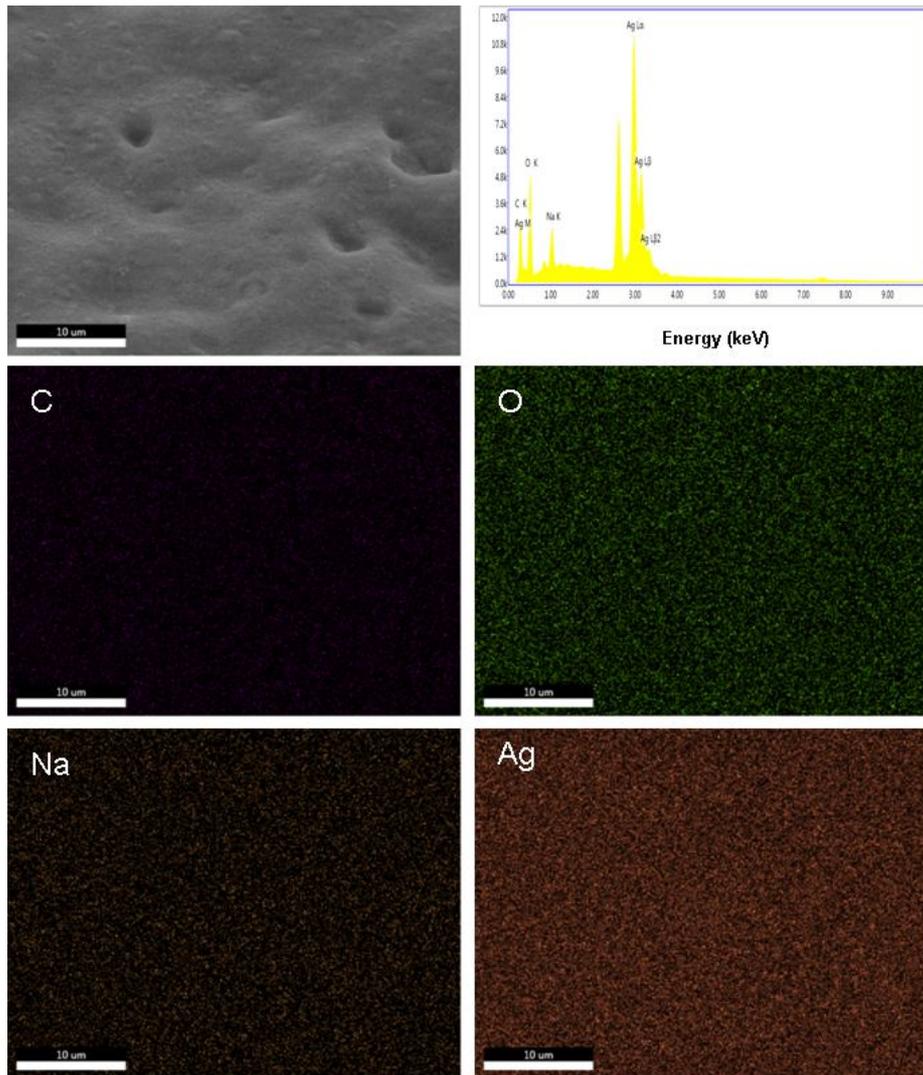
**Figure S3.** FTIR spectra of Na-alg and Ag-alg.



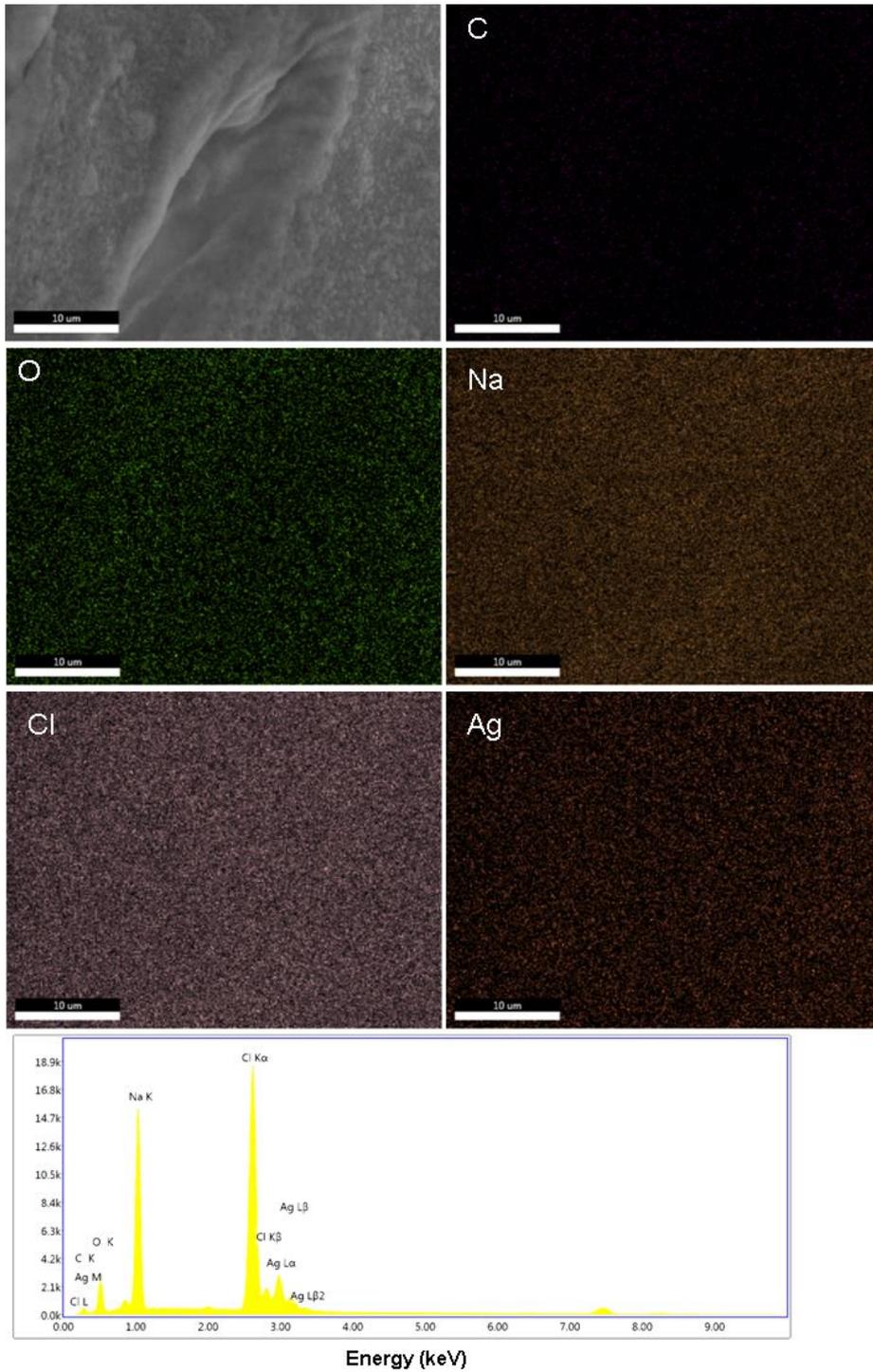
**Figure S4.** The size distribution of the Ag-alg beads and Ag-alg capsules.



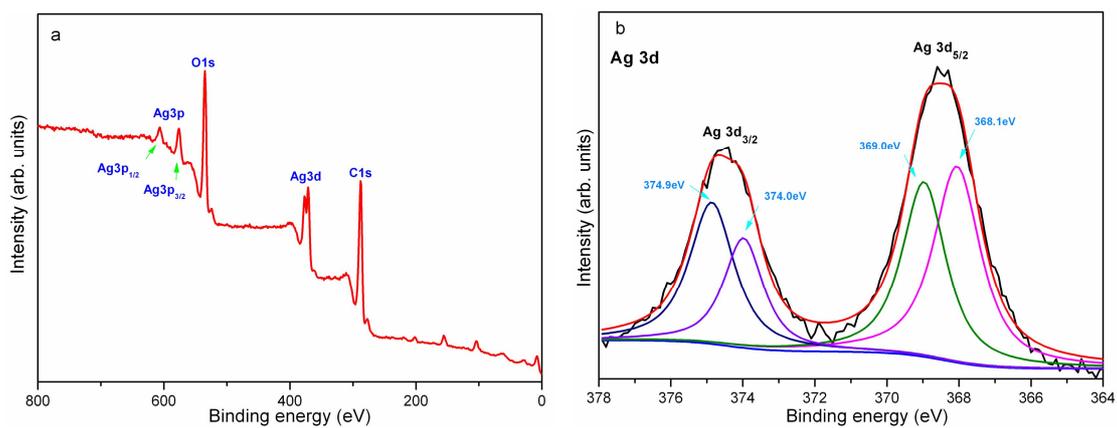
**Figure S5.** FESEM images of a) Ag-alginate capsule b) the surface of the capsule c) the capsule added NaCl aqueous solution d) the surface after triggering process



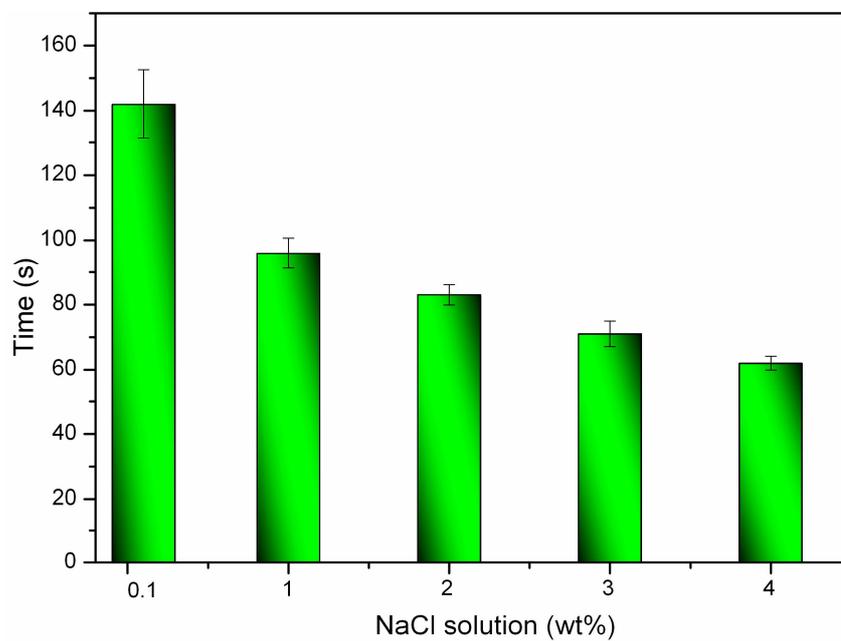
**Figure S6.** FESEM-EDS compositional elements analysis and mapping images of the Ag-alg capsule



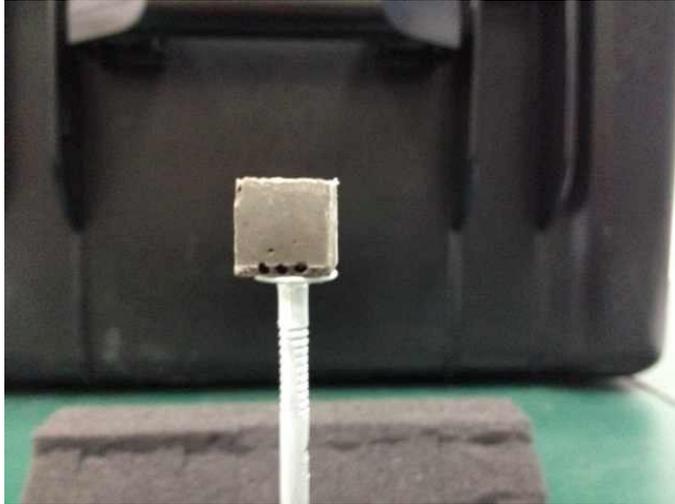
**Figure S7.** FESEM-EDS compositional elements analysis and mapping images of the Ag-alg capsule exposed to chloride ions.



**Figure S8.** a) XPS survey spectra of Ag-alg. b) High-resolution XPS spectra of Ag 3d in Ag-alg.



**Figure S9.** The triggering time of Ag-alginate capsules added with different concentration of NaCl solution.



**Figure S10.** The concrete specimen embedded with chloride ions responsive Ag-alg capsules