

Supporting Information

A dual crosslinked polysaccharide hydrogels with self-healing and stretchable properties

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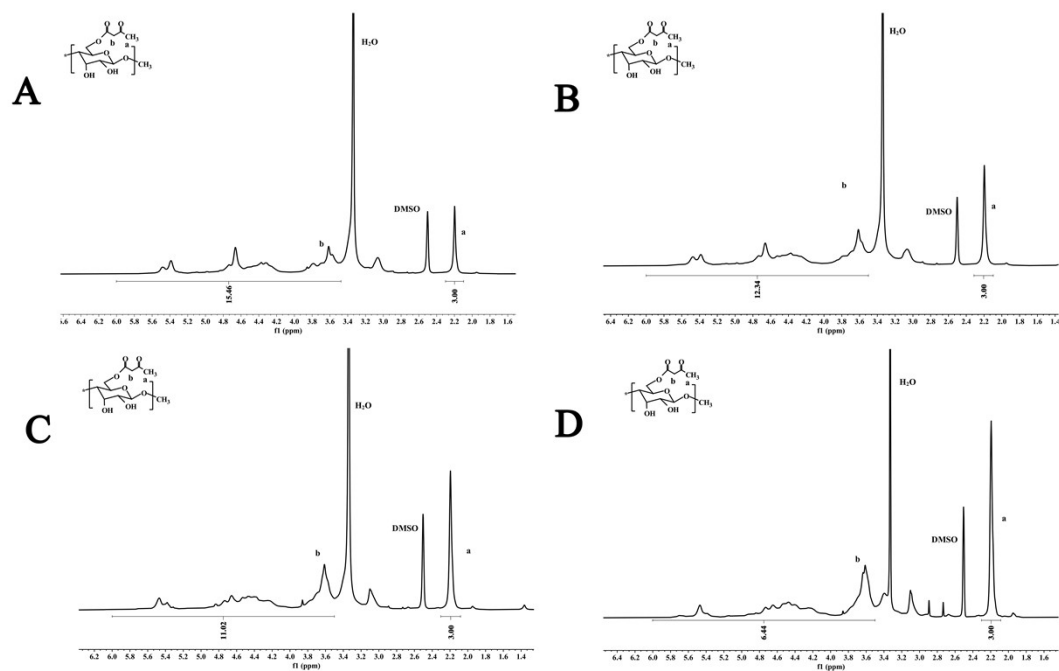


Fig.s1 ^1H NMR spectra of CAA with different molar ratios of T-BAA to cellulose.

(A) 2:1; (B) 3:1; (C) 4:1; (D) 5:1.

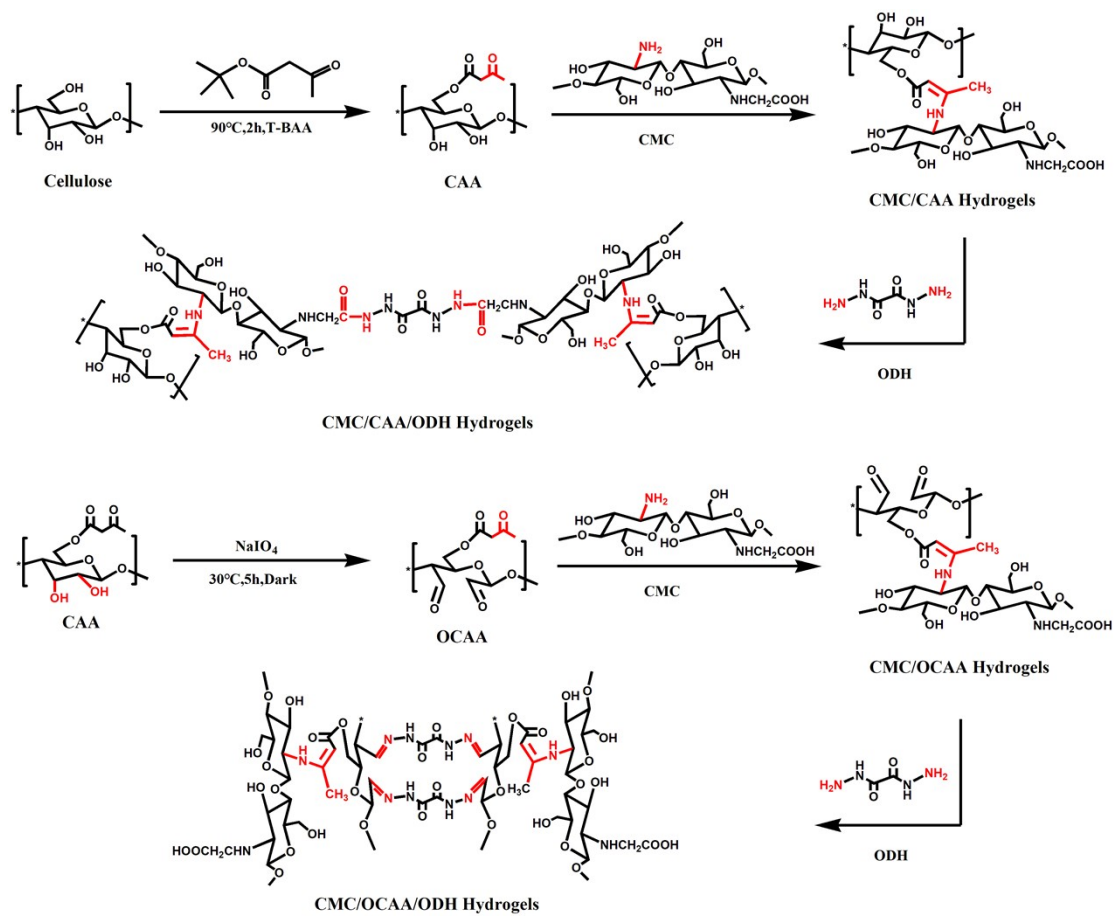


Fig.s2. ODH effect in the gelation mechanism of CMC/CAA and CMC/OCAA hydrogels.



Fig.s3. Appearance photos of difference hydrogels with or without ODH.

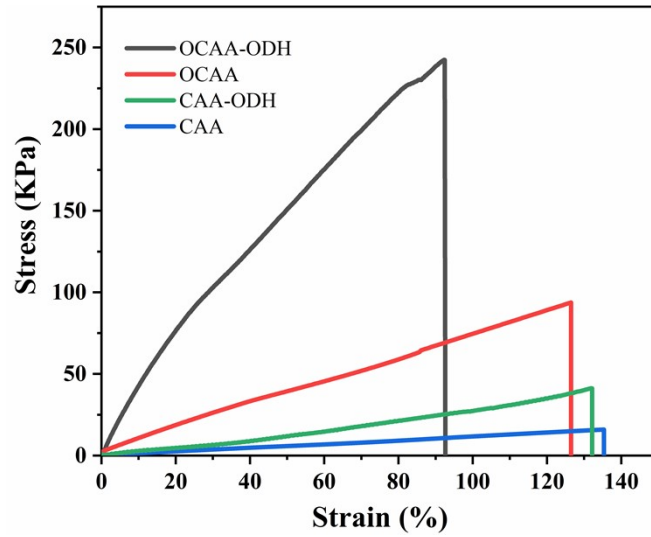


Fig.s4. Tensile curves of two hydrogels with or without ODH.

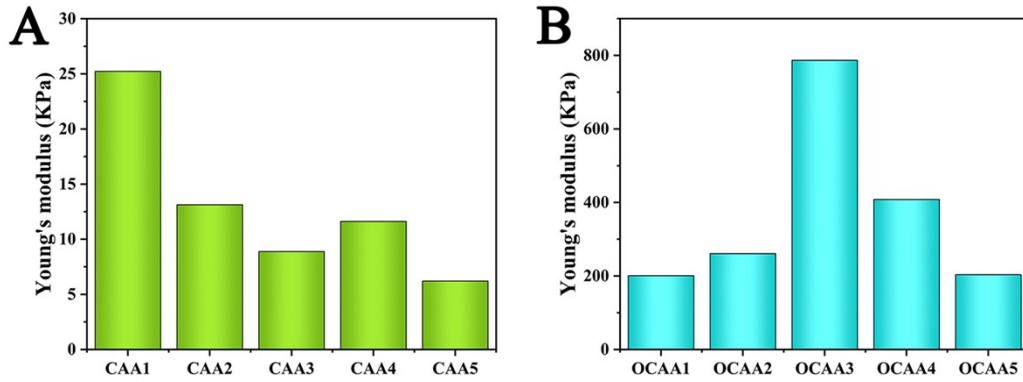


Fig.s5. Young modulus of (A) CMC/CAA and (B) CMC/OCAA hydrogels.

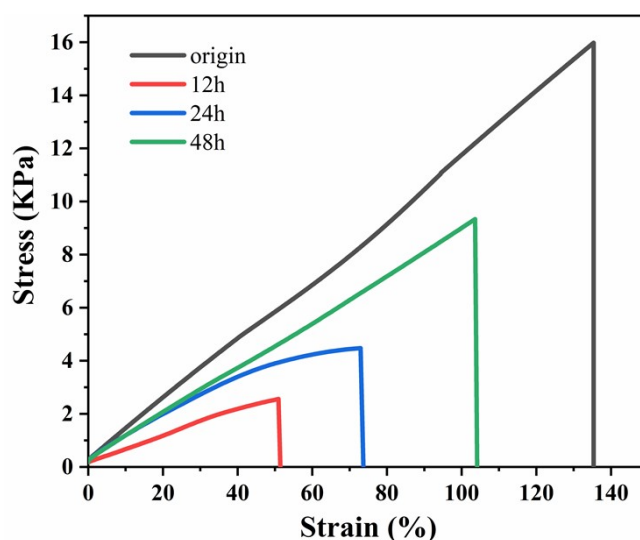


Fig.s6 Tensile strength of CAA-4 hydrogel after different self-healing time.

Table.s1 Self-healing efficiency of hydrogels at different recovery time

	12h	24h	48h
CAA hydrogel	16.03%	28.02%	58.43%
OCAA hydrogel	34.12%	57.02%	83.30%

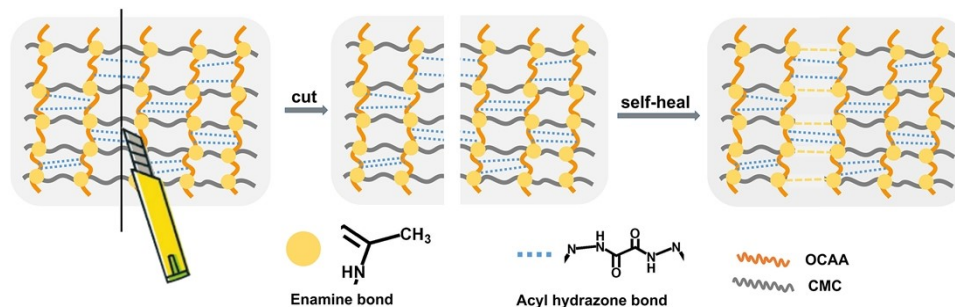


Fig.s7. Self-healing mechanism of CMC/OCAA hydrogels.

Cytotoxicity test

Cytocompatibility of OCAA-4 hydrogel was investigated in L929 cell using MTT assays.^{1, 2} Different quantities of OCAA-4 hydrogel (25 mg, 50 mg, 75 mg, 100 mg) were immersed in 5 mL Dulbecco's Modified Eagle Medium (DMEM) supplemented with 10% Fetal Bovine Serum (FBS) for 24 h. L929 cells were seeded at a density of 2×10^4 in 96 well plates, and after 24 h of culture, the extracts of examined hydrogels were added to the cells. The control group was cells cultured

with complete DMEM (without the extraction of hydrogel). After 24 h, 20 μ L of MTT solution (5 mg/mL) was added to the cells and incubated for another 4 h. Then the formed formazan crystals were dissolved by DMSO. The relative cell viability (%) was determined by comparing the absorbance at 490 nm with control group by a Spectra Max190 microplate reader (Japan Electronics, Japan).

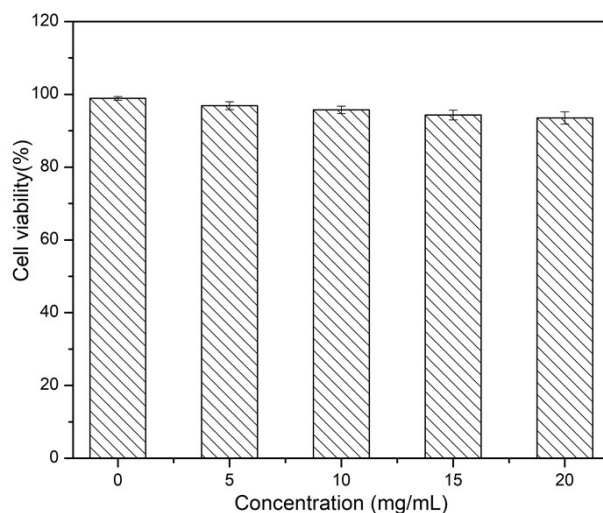


Fig.s8 Cell viability MTT assay for different concentration of OCAA-4 hydrogel with mouse fibroblast L929 (n=6, error bars represent standard deviations)

From the cell cytotoxicity test result in Fig.s8, no obvious toxicity was observed even in relatively high concentrations compared with control group. This further displayed the good biocompatibility of the prepared OCAA-4 composite hydrogel.

Antibacterial rate test

To investigate the antibacterial performance of CAA and OCAA hydrogels, the CFU counting assay^{3, 4} was carried out on the *S. aureus*. The hydrogel samples (10 mm diameter circles) were sterilized with UV lamp and added to 10 mL LB medium co-cultured with the *S. aureus* (10 μ L, 10^6 CFU / mL) at 37 °C for 12 h. The experiments were performed with three sets of parallel controls, the blank control was carried without hydrogels, followed by CFU counting assay. The antibacterial rate formula is expressed as follows:

$$\text{Antibacterial rate (\%)} = \left(1 - \frac{C}{N}\right) \times 100\% \quad (1)$$

where N is the average number of viable bacteria in the blank control group after 12 h and C is the average number of viable bacteria in the experimental groups after 12 h.

The results indicate OCAA-4 hydrogel has the highest average antibacterial rate of 55.7%.

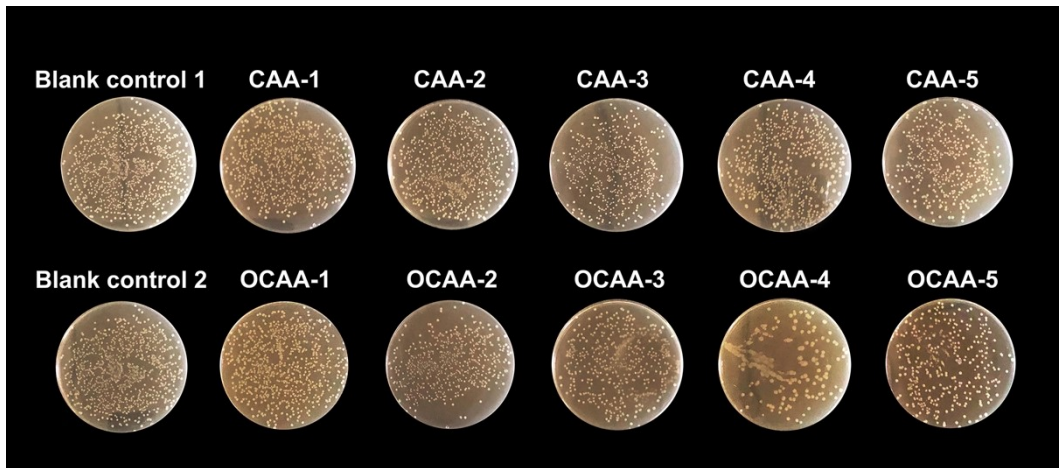


Fig.s9. Representative photographs of bacterial CFU counting treated with CAA and OCAA hydrogels.

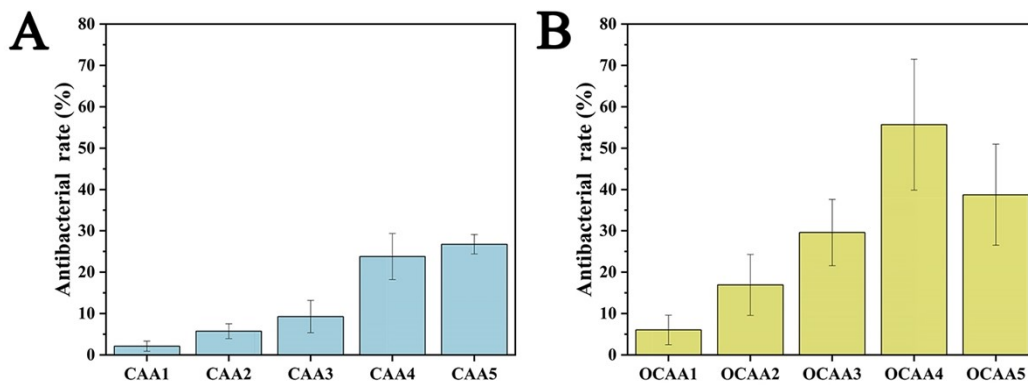


Fig.s10. Antibacterial rate of (A) CAA and (B) OCAA hydrogel for S.aureus.

References

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