

Supplementary information

On-demand & on-site shape-designed mineralized hydrogel with Calcium Supply and Inflammatory Warning properties facing to cranial repair application

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Table 1. Preparation and parameters of the XG mineralized hydrogels

| Sample | xanthan gum(g) | CaCO ₃ (g) | lactic acid(mL) | water (g) | calcium lactate(g) | calcium lactate content(wt%) |
|------------------------|----------------|-----------------------|-----------------|-----------|--------------------|------------------------------|
| XG-hydrogel | 0.40 | 0.00 | 0.0 | 30.0 | 0.00 | 0.00 |
| XG/Ca-13 | 0.40 | 1.50 | 3.0 | 30.0 | 0.00 | 13.01 |
| XG/Ca-27 | 0.40 | 3.00 | 6.0 | 30.0 | 0.00 | 27.68 |
| XG/Ca-39 | 0.40 | 4.50 | 9.0 | 30.0 | 0.00 | 39.74 |
| XG-Ca-50 | 0.40 | 6.00 | 12.0 | 30.0 | 0.00 | 50.81 |
| XG-CaCO ₃ | 0.40 | 1.50 | 0.0 | 30.0 | 0.00 | 0.00 |
| XG-Ca(LA) ₂ | 0.40 | 0.00 | 0.0 | 30.0 | 4.62 | 13.01 |

*the calcium lactate content was obtain by calculation

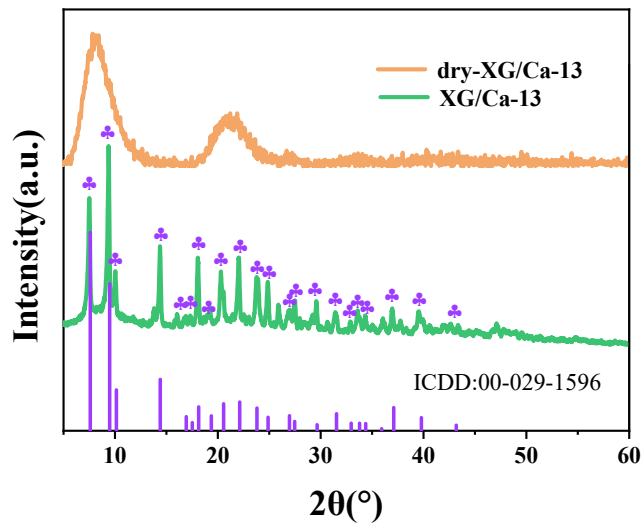


Fig. S1. XRD image of the XG/Ca-50 hydrogel

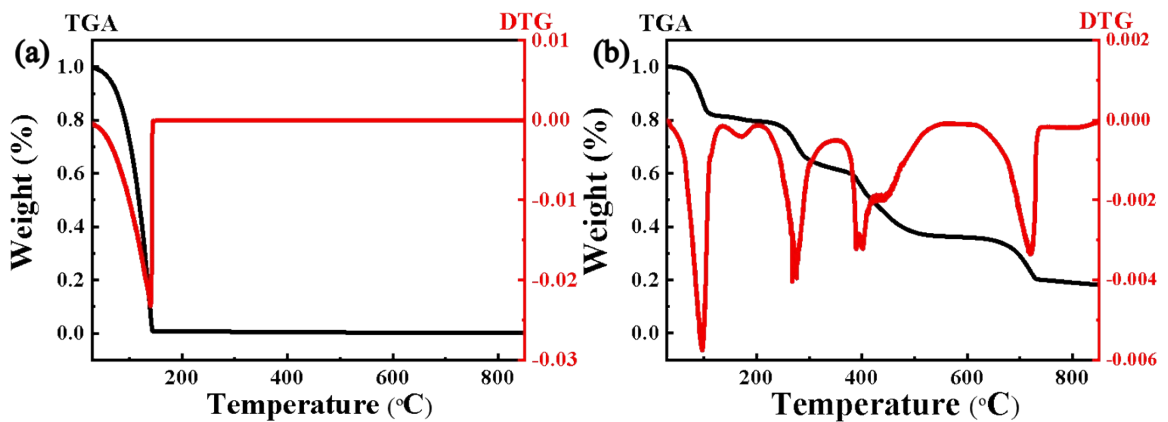


Fig. S2. TG image of the mineralized hydrogels(1-the XG hydrogel; 2-XG/Ca-50 hydrogel).

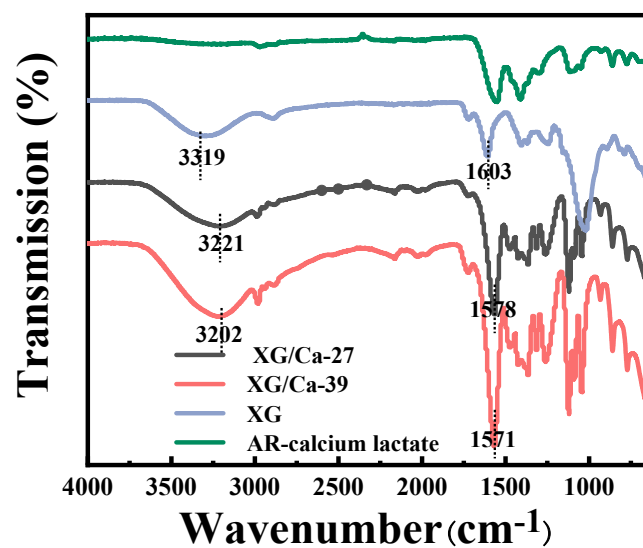


Fig. S3. FTIR image of the freeze-dried the different XG hydrogel.

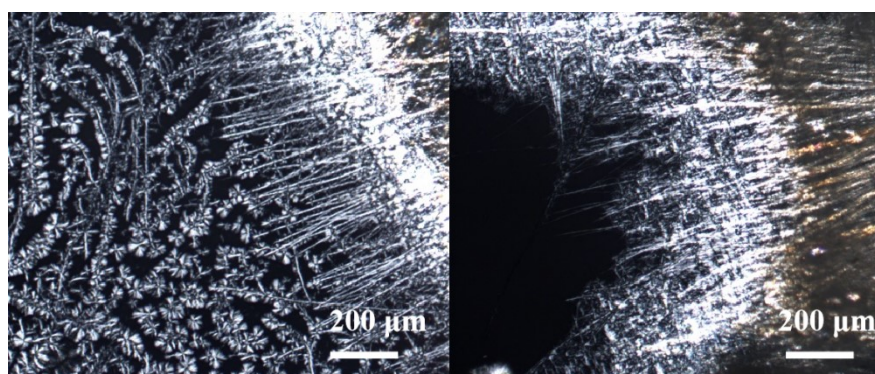


Fig. S4. POM image of the lactic acid solution.

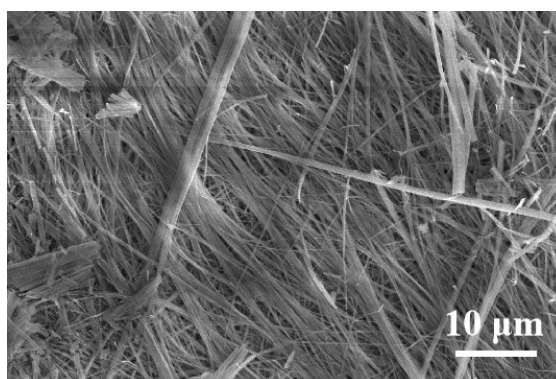


Fig. S5. SEM image of the different heating time of the freeze-dried XG/Ca(LA)₂ hydrogels.

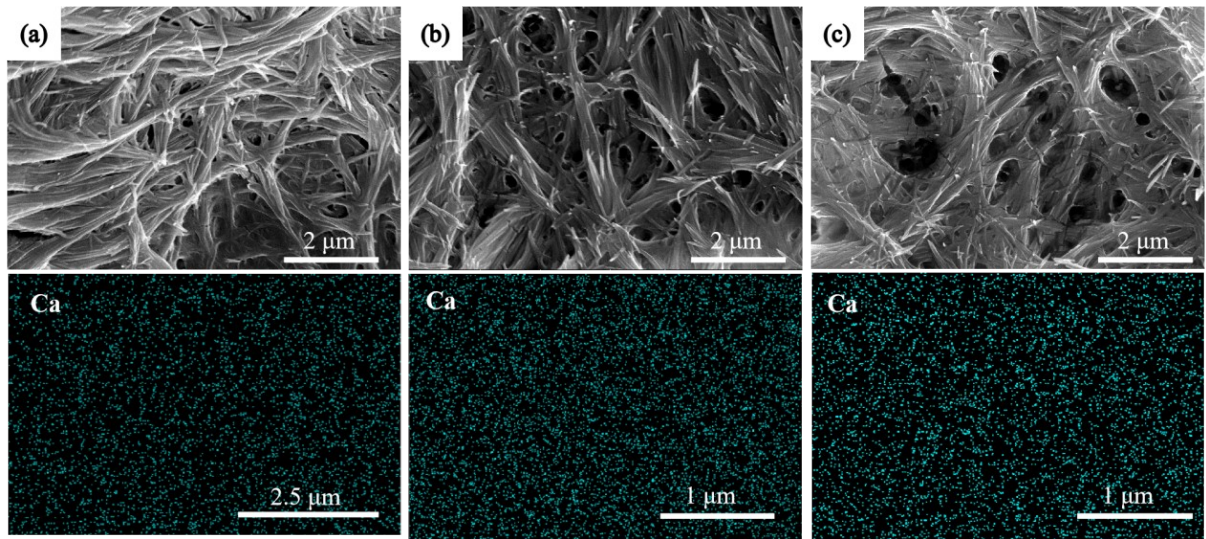


Fig. S6. SEM/EDS element mapping images of the different content of calcium lactate/XG/Ca-X hydrogels (a-27.68%; b-39.74%; c-50.81%).

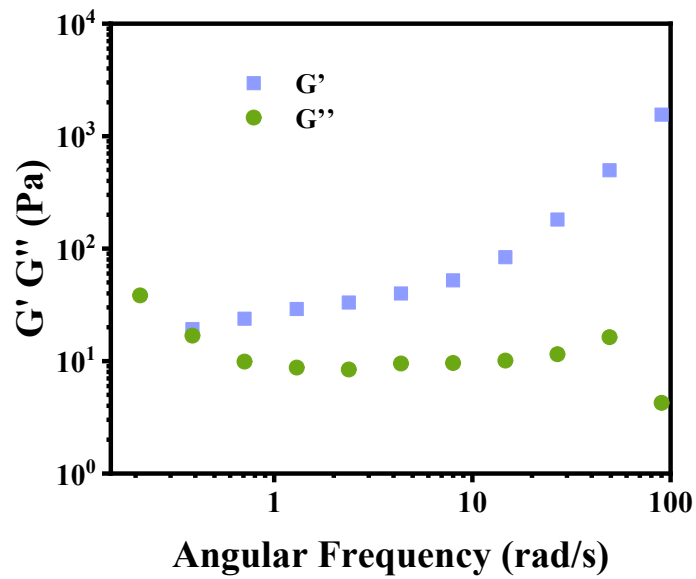


Fig. S7. Frequency of the storage (G') and loss (G'') moduli of the XG hydrogel with CaCl_2 (1.66 g) and calcium lactate(3 mL).

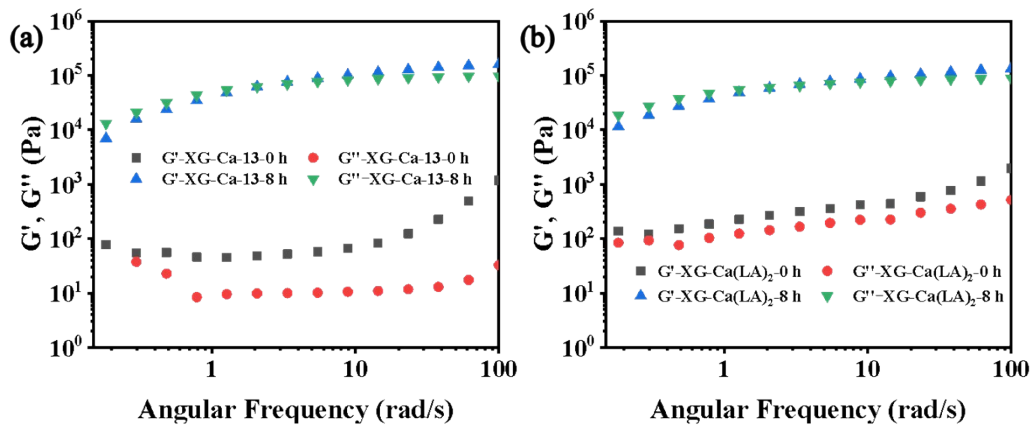


Fig. S8. (a) Frequency of the storage (G') and loss (G'') moduli of the different heating time XG/Ca-13 hydrogels; (b) Frequency of the storage (G') and loss (G'') moduli of the different heating time XG/Ca(LA)₂ hydrogels

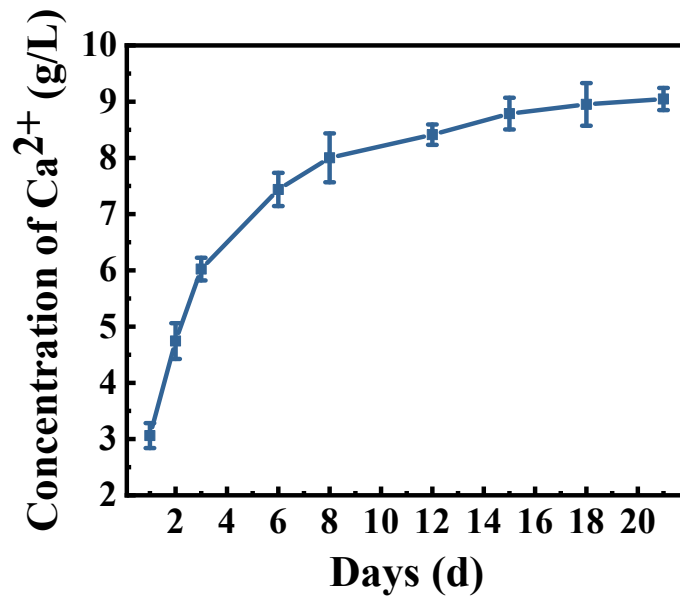


Fig. S9. Calcium ions release curves for the Ca-X hydrogel from 1 d to 21 d.

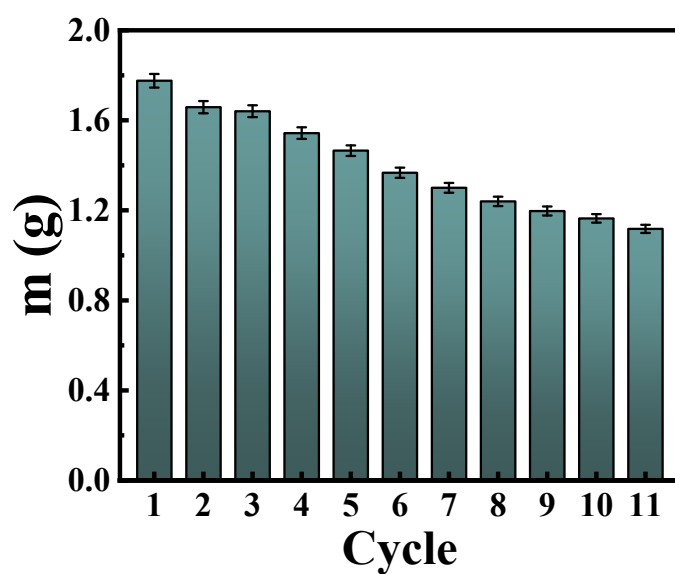


Fig. S10. The change of the XG/Ca-50 hydrogels mass with heating and cooling cycles

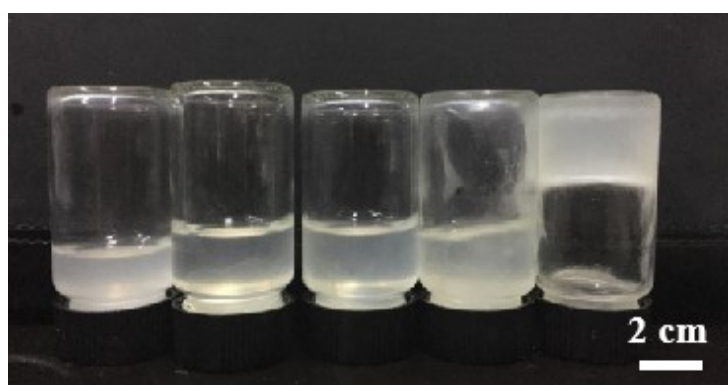


Fig. S11. The photo of xanthan gum hydrogel, the concentrations from left to right were 0.15 g/30 mL, 0.18 g/30 mL, 0.21 g/30 mL, 0.24 g/30 mL, and 0.27 g/30 mL, respectively.

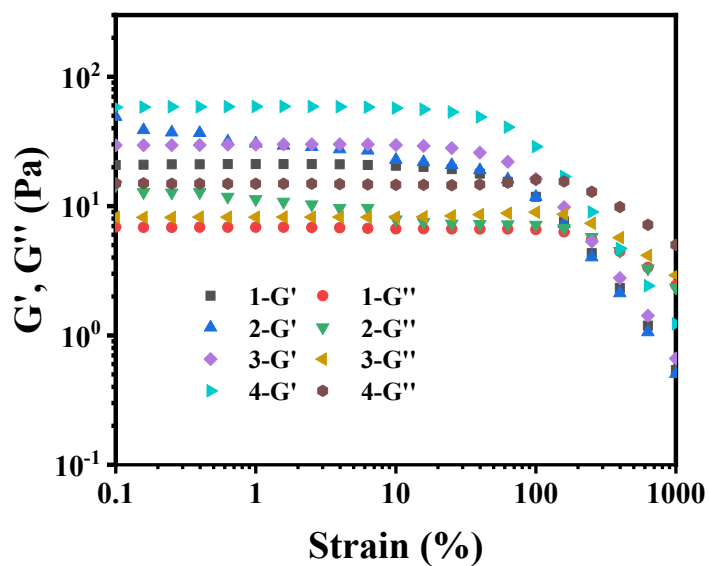


Fig. S12. The frequency(a) and strain(b) of the storage (G') and loss (G'') moduli of the xanthan gum hydrogels (the content of XG: 1-0.30 g/30mL; 2-0.35 g/30mL; 3-0.40 g/30mL; 4-0.45 g/30mL).

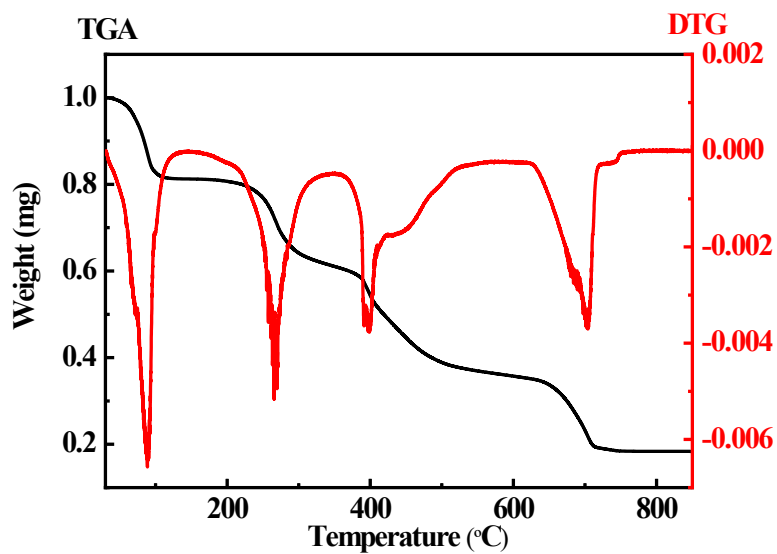


Fig. S13. The Tg of the XG-Ca(LA)₂ hydrogel.