Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting information

Hierarchical hydrogel scaffolds with clustered and oriented structure

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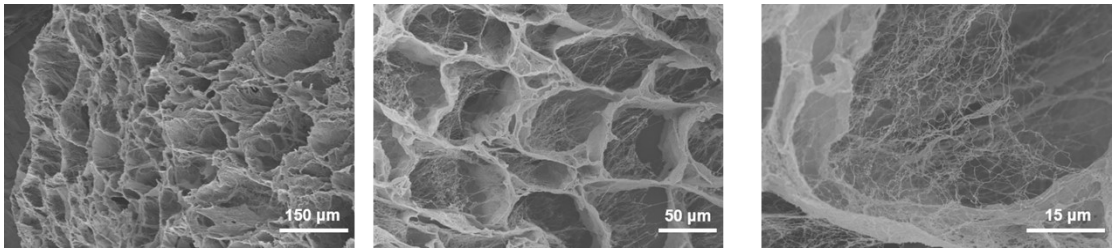

Fig. S1 SEM images of cross sections of COS-3PVA/3Alg hydrogels.

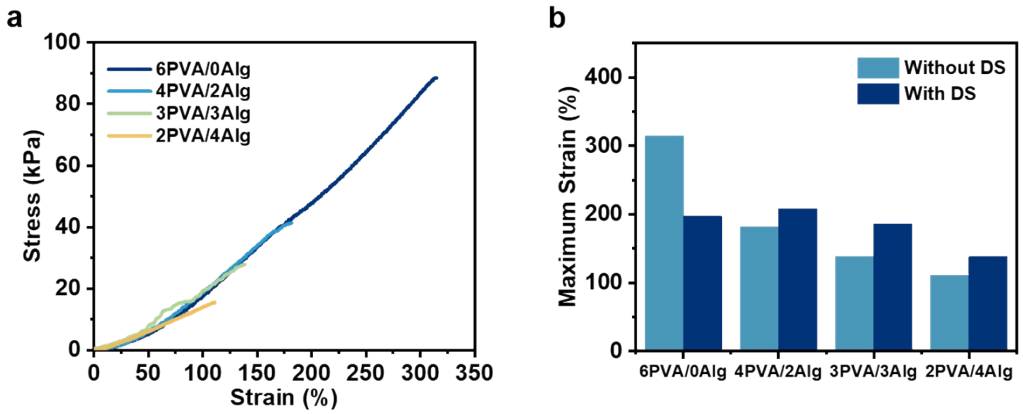

Fig. S2 a, Tensile stress-strain curve of COS-PVA/Alg hydrogels without DS in different polymer proportions. **b**, Maximum Strain of COS-PVA/Alg hydrogels with and without DS in different polymer proportions.

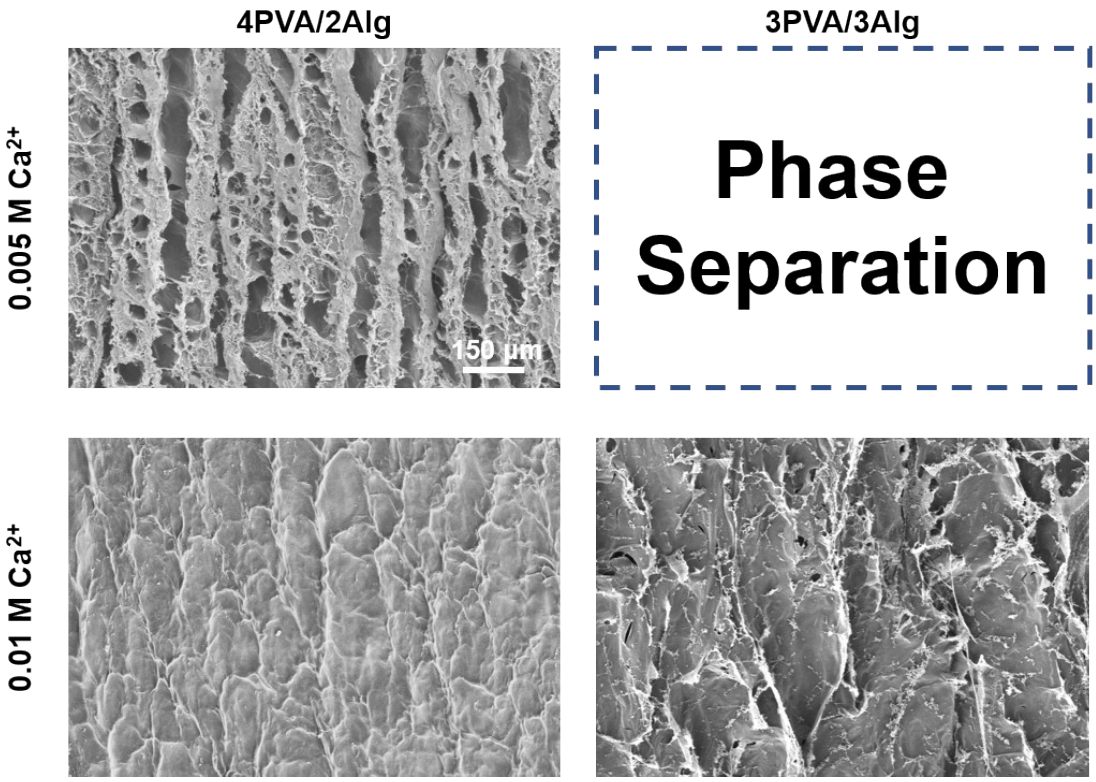

Fig. S3 SEM images showing the structure of COI-PVA/Alg hydrogels crosslinked with 0.005 M and 0.01 M Ca^{2+}.

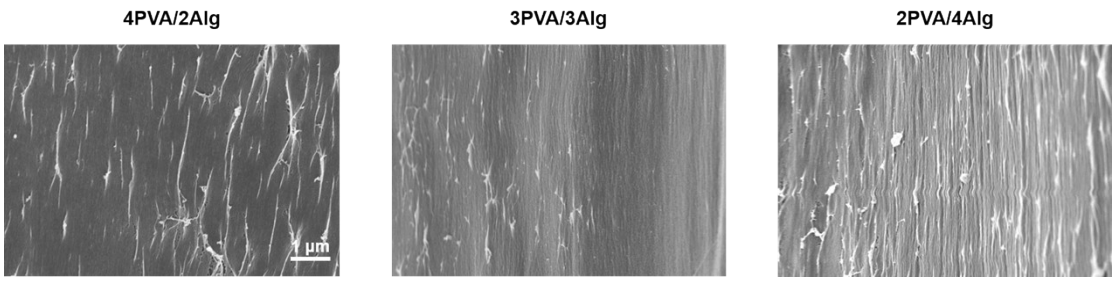

Fig. S4 SEM images showing the clustered and oriented structure of COI-PVA/Alg hydrogels crosslinked with 0.04 M Ca^{2+}.

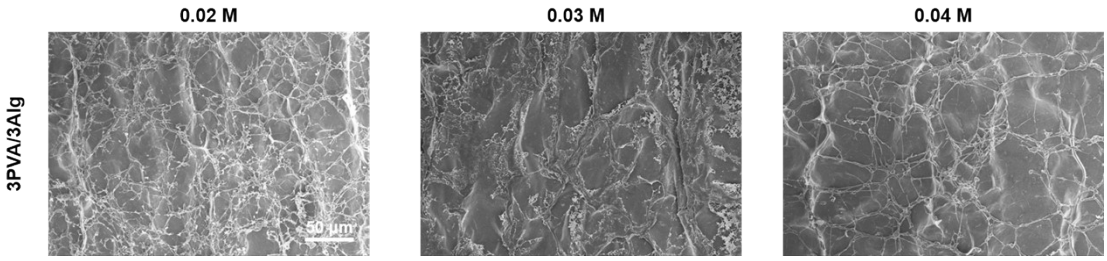

Fig. S5 SEM images of 3PVA/3Alg hydrogels crosslinked with Ca^{2+} without DS.

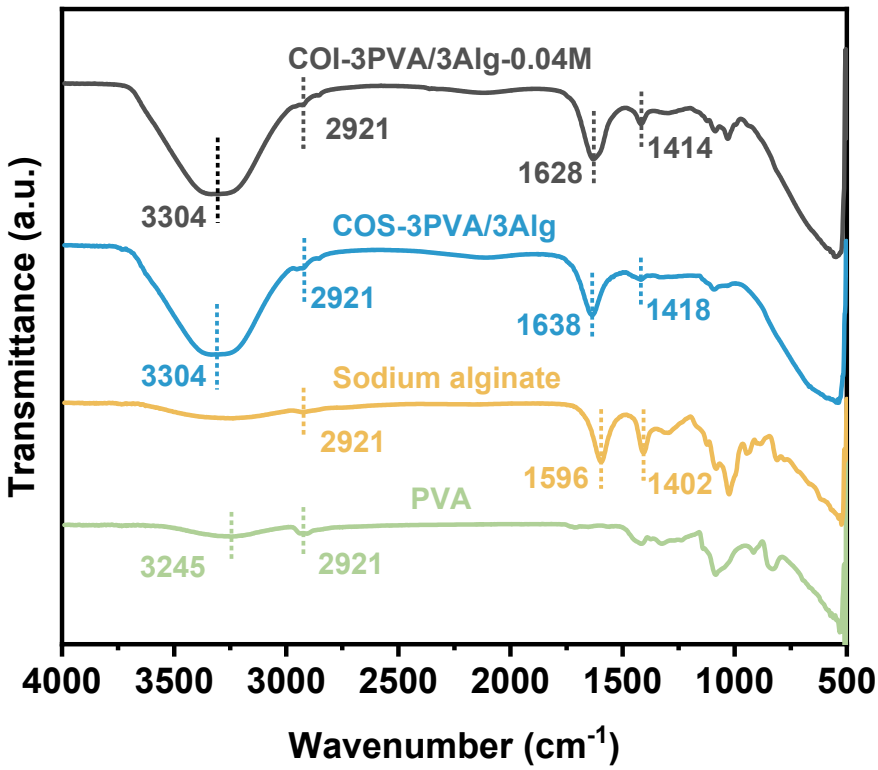

Fig. S6 Typical FT-IR spectra of COI-3PVA/3Alg-0.04 M hydrogel, COS-3PVA/3Alg hydrogel, sodium alginate and PVA.

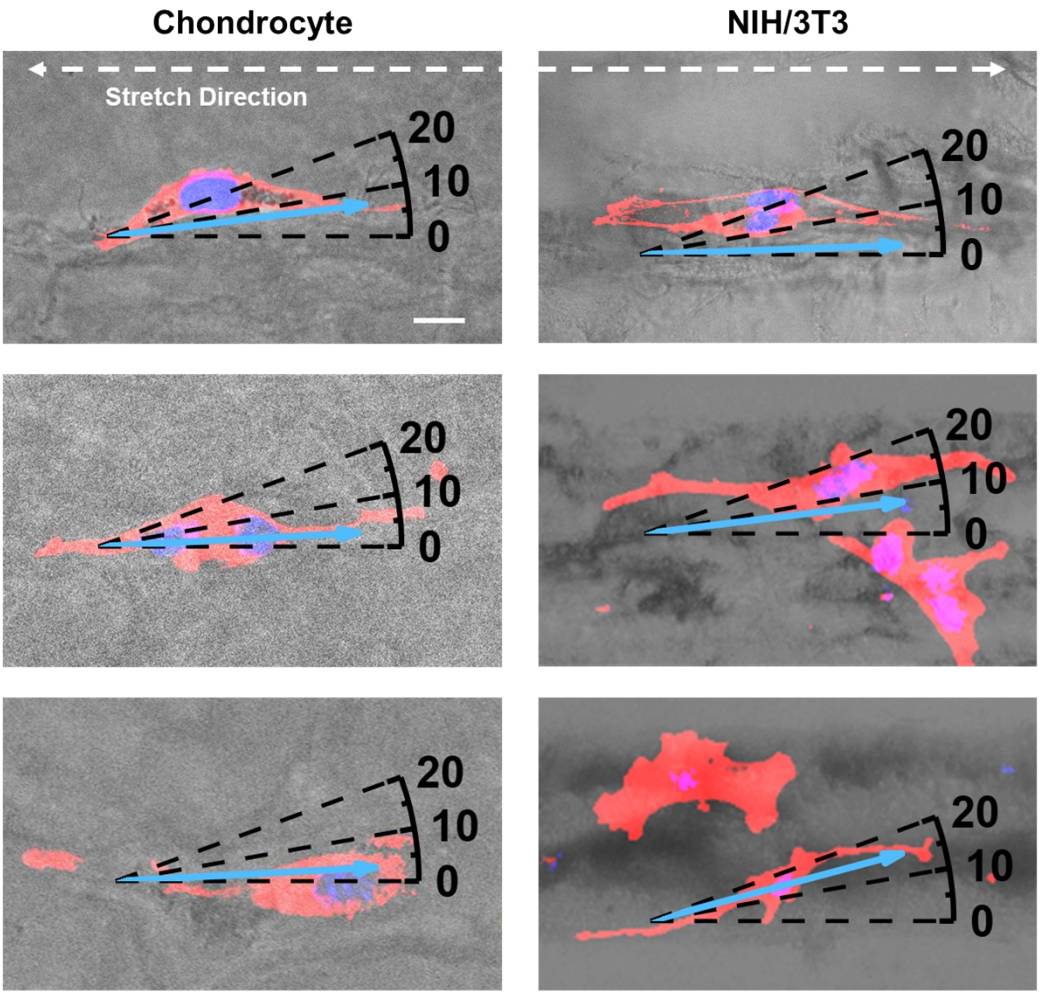

Fig. S7 Typical oriented fibroblasts on COS-3PVA/3Alg hydrogels and chondrocytes on COI-3PVA/3Alg-0.04 M hydrogels.

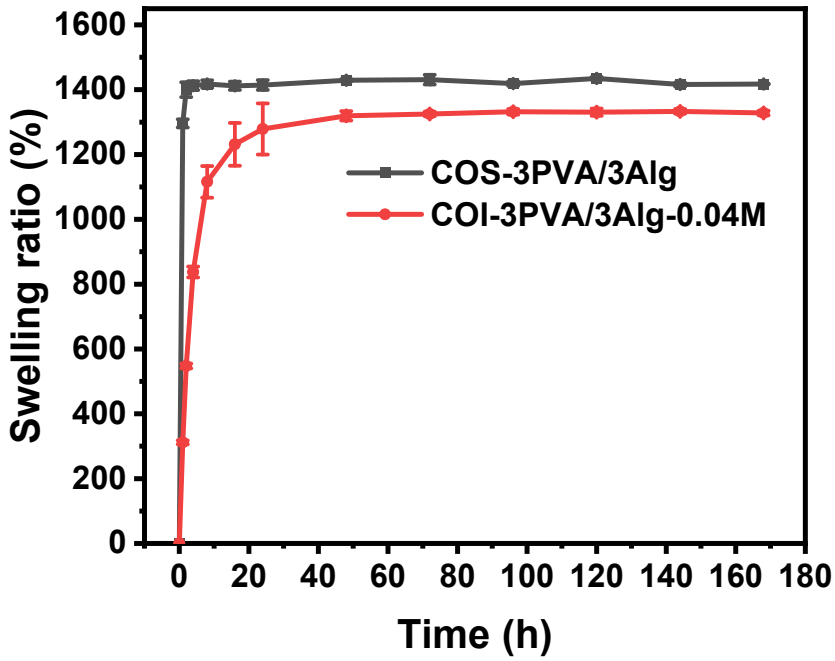

Fig. S8 Swelling properties of COS-3PVA/3Alg hydrogels and COI-3PVA/3Alg-0.04 M hydrogels in PBS.

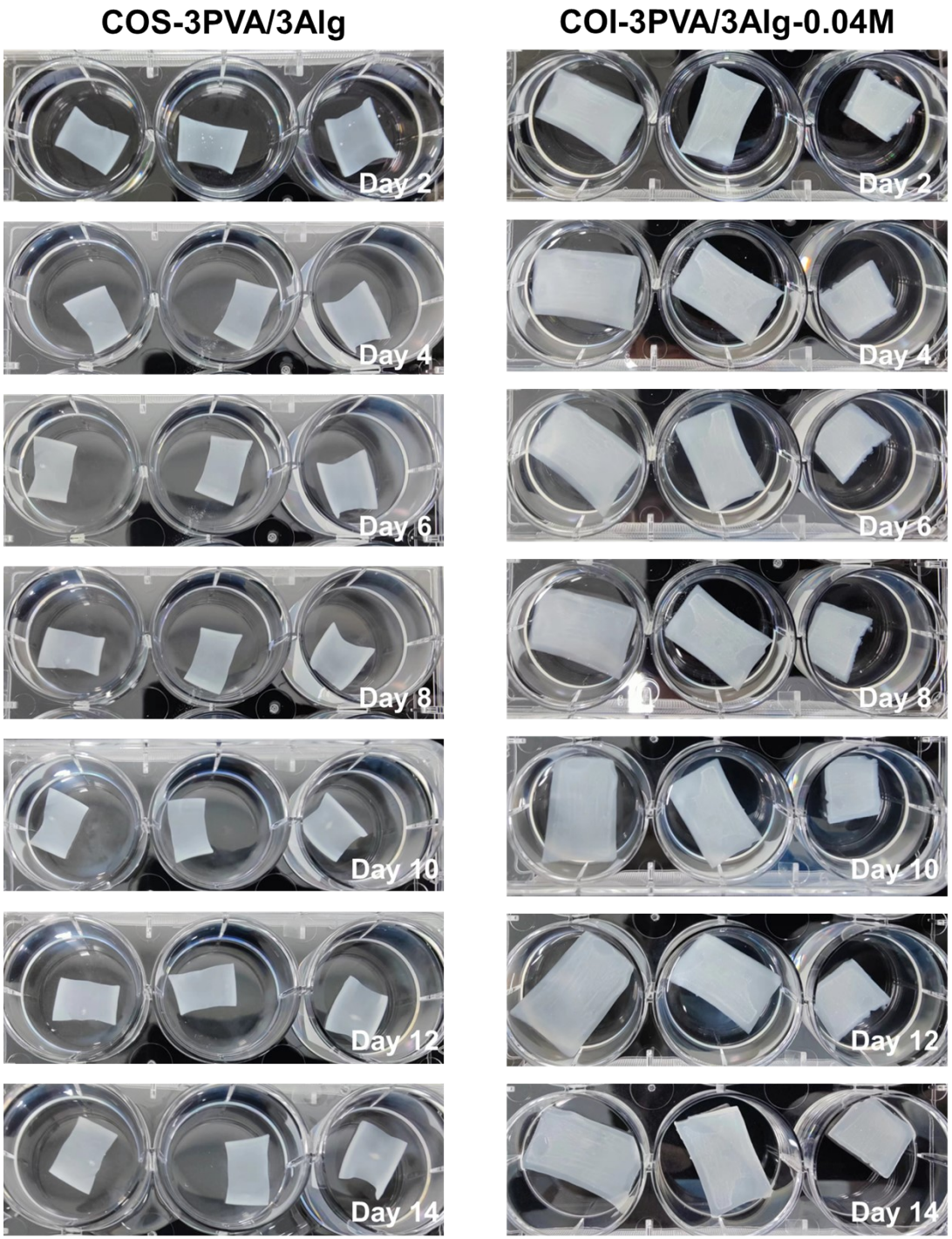

Fig. S9 Images of COS-3PVA/3Alg hydrogels and COI-3PVA/3Alg-0.04 M hydrogels degradation at 37℃ for 14 days.

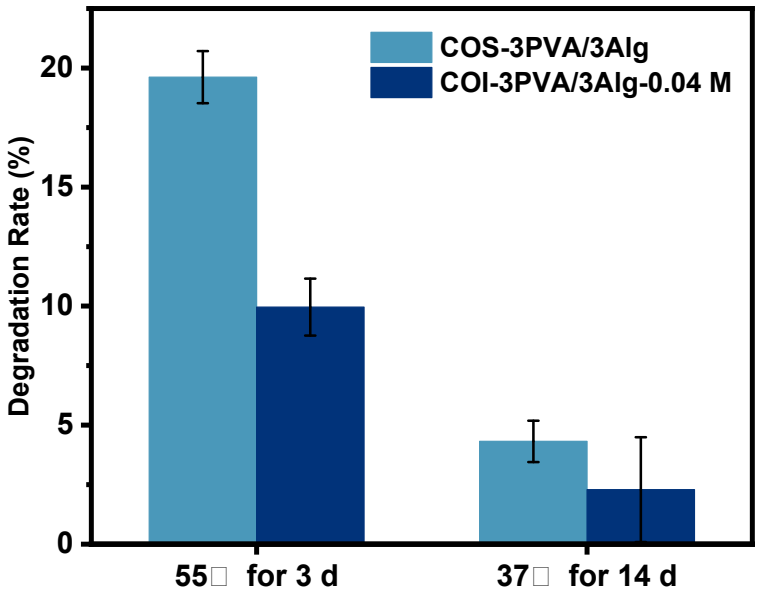

Fig. S10 Degradation rate of COS-3PVA/3Alg and COI-3PVA/3Alg-0.04 M at 55℃ for 3 days and 37℃ for 14 days, respectively.

Table. S1 Mechanical Properties and Microstructure Comparison of Various Hydrogels

Ref No.	Materials	Methods	Young Modulus	Water Content	Biocompatibility	Microstructure
Our work	PVA/Alg	Direction freezing; Drying under stretch	50 kPa-20 MPa	60%-95%	Good	Hierarchical; Oriented and Clustered
[1]	Silk	Lyophilization	2.05 MPa	--	Good	Aligned microfibers
[2]	PVA	Freeze–thawed; salting out	24-2500 kPa	85%	--	Continuous networks of nanofibrils
[3]	HPC/PVA	Freeze–thawed	15-900 kPa	--	--	Porous wrinkle structure
[4]	NaCl/SA/PAM	One-pot free-radical polymerization	0.75 MPa	--	--	Supramolecular nanofibrils
[5]	AMD-QCS	UV-polymerization; One-pot method	1.5 MPa	--	Good	Homogeneous pore microstructure
[6]	Al-NC	UV-polymerization	52.3 MPa	62.3%	Poor	Lotus-leaf-like microstructure
[7]	B-DN	UV-polymerization	2 MPa	42%	--	Isotropic structure
[8]	PVA/PAM/NaCl	One-pot method	595-872 kPa	--	--	3D porous and dense microstructure

References

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