Supporting Information

CT adjustability and CT uniformity

Tab. S1 Formulation Tab.of CT values of CT/PAA-Ca hydrogel and aqueous solution

Ca （wt%）	CT_{hyd} value（HU）	SD（HU）	CT_{wat} Value（HU）	SD（HU）
0.000	25.78	22.79	-11.66	20.61
0.013	34.60	25.23	-7.67	20.10
0.132	35.33	25.90	0.13	21.06
0.263	50.27	25.91	21.88	21.90
0.648	65.45	23.13	61.30	22.93
2.419	174.38	26.74	136.63	21.92
4.443	300.27	22.19	267.28	19.50

Tab. S2 Change Tab.of CT value of calcium ion in CT/PAA-Fe-Ca hydrogel

Fe(wt%)	Ca（wt%）	Mean CT （HU）	SD（HU）
0.046	0.060	49.92	14.21
0.046	0.237	60.84	26.81
0.046	0.587	82.95	28.91
0.046	1.154	101.35	23.79
0.046	2.237	167.58	27.21
0.046	3.254	227.15	16.64
0.046	4.212	278.06	18.23

Tab. S3 Water absorption and CT value of CT/PAA-Ca hydrogel

Calcium content (wt%)	Water content（wt%）	water absorption 0days(g/g)	water absorption 14days(g/g)	water absorption 28days(g/g)	Mean CT(HU)	SD(HU)
0.000	86.73	0.496	0.413	0.353	25.78	22.79
0.013	86.24	1.579	1.367	1.292	34.6	25.23
0.132	85.84	5.22	4.922	4.583	35.33	23.9
0.648	84.42	2.608	2.441	2.276	65.45	24.91
2.419	78.97	1.276	1.147	1.093	174.38	22.19

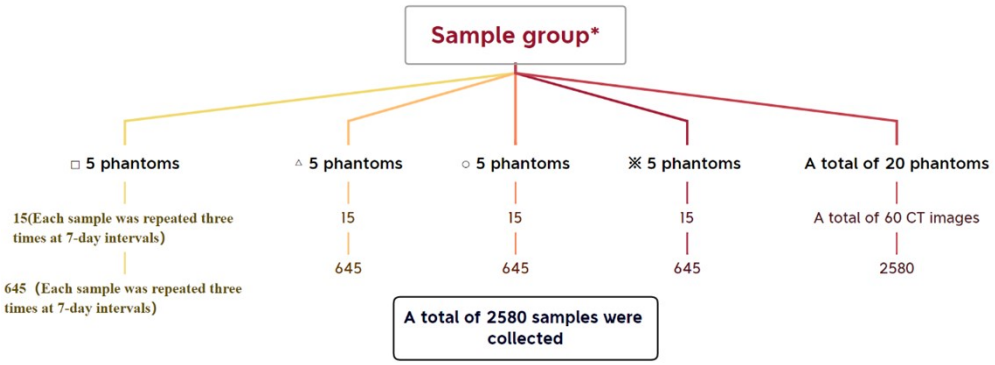

Fig. S1 Sample grouping process

Fig.S2 CT and physical images of various modified materials

Tab.S4. CT value of various modified materials

	1	2	3	4	5
Materials	Modified PC	Modified PA6-1	Modified PVC	Modified PVC	Modified PA6-2
CT（HU）	147	170	709	680	39

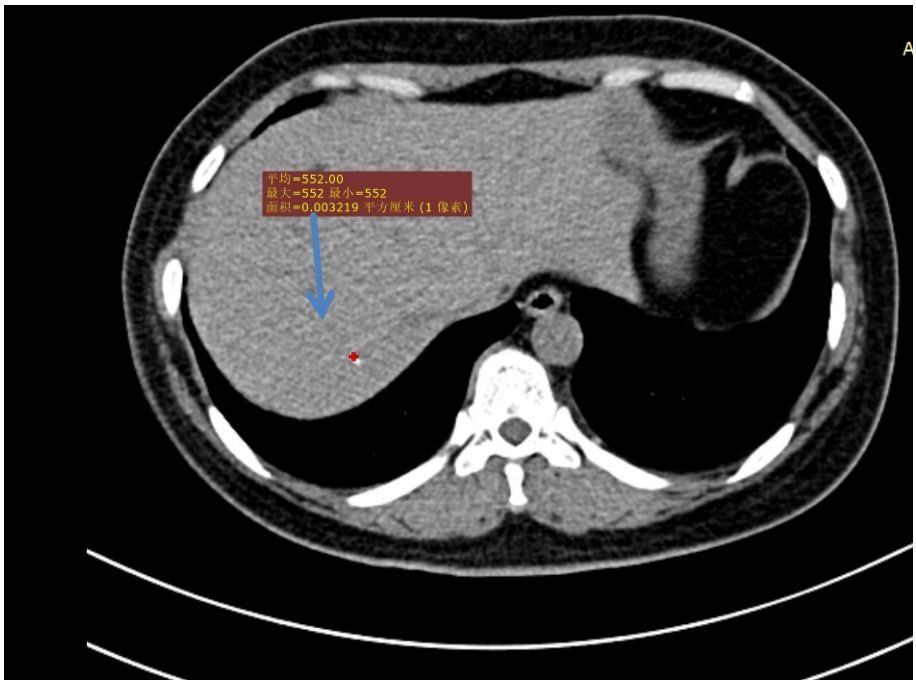

Fig.S3. CT of calcification in patient 1's liver

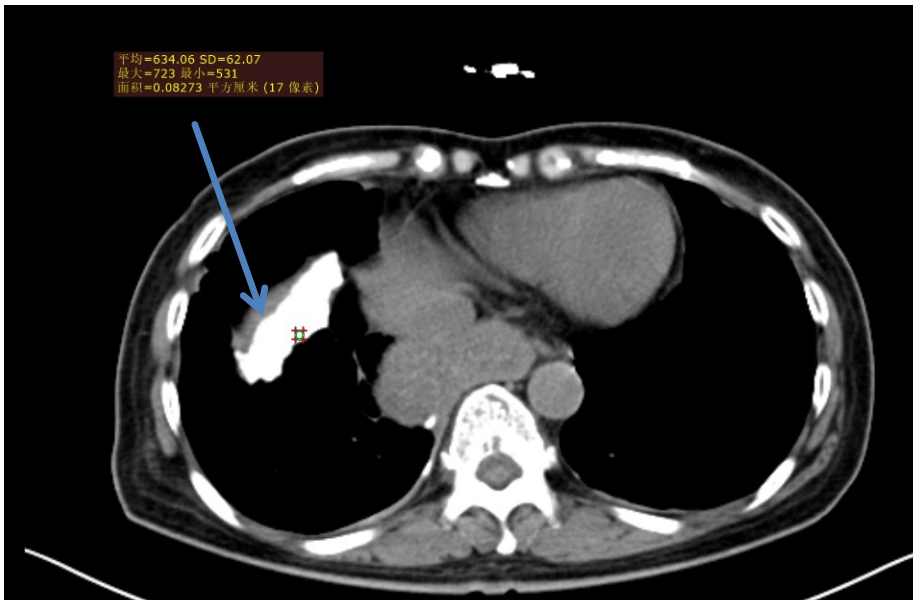

Fig.S4. CT of calcification in patient 2's liver

The CT value of the liver calcification foci in Figs.S3-S4 are about 500-630HU. Therefore, in the comparison of several modified materials, PVC material No. 3 and No. 4 (the same kind) is superior to several other materials in the matching degree of process and CT value.Figs.S3-S4. are calcium visceral calcification foci were provided for two patients, one with 634HU and one with 552HU.Therefore, the selection of modified PVC materials 600-700HU can better simulate the focal part of the tissue.

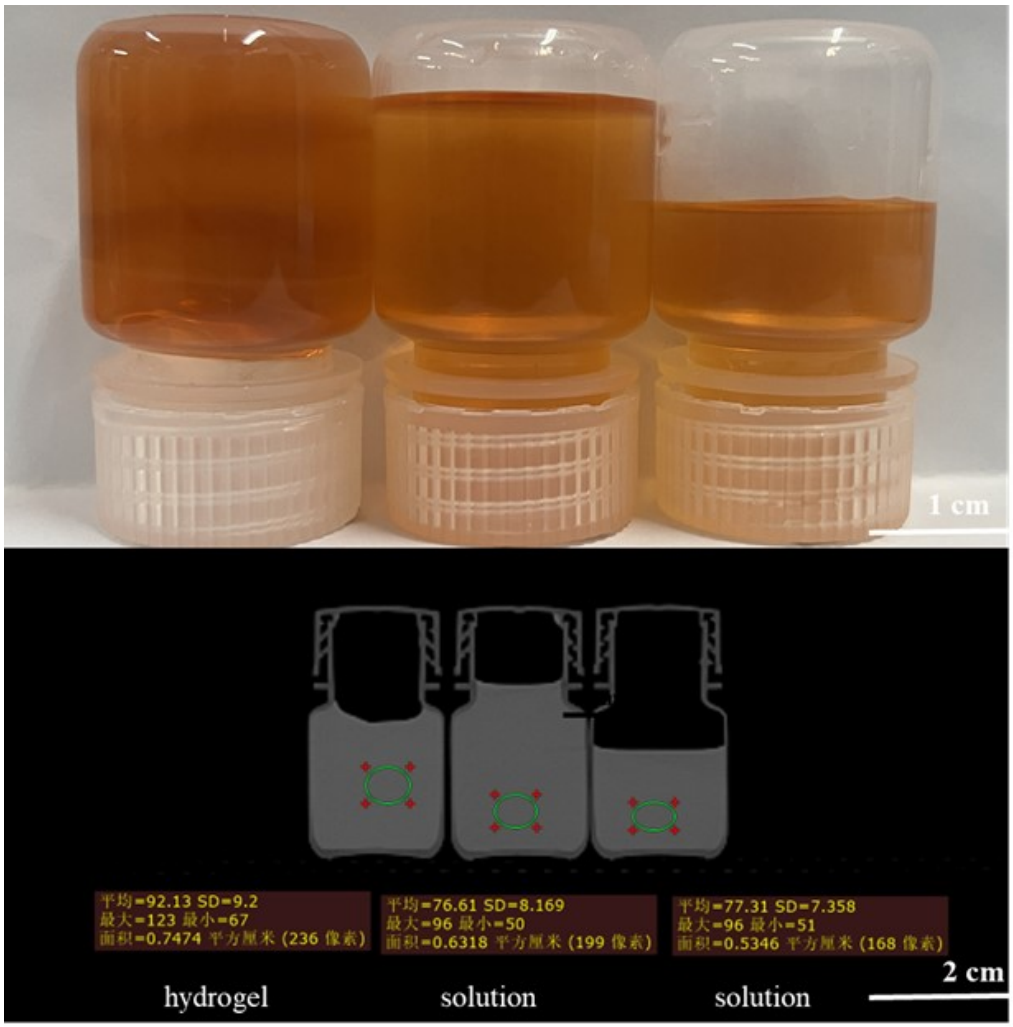

Fig.S5. The influence of the structure of the hydrogel network on the CT value, the left is hydrogel, and the right is aqueous solution with equal concentration.

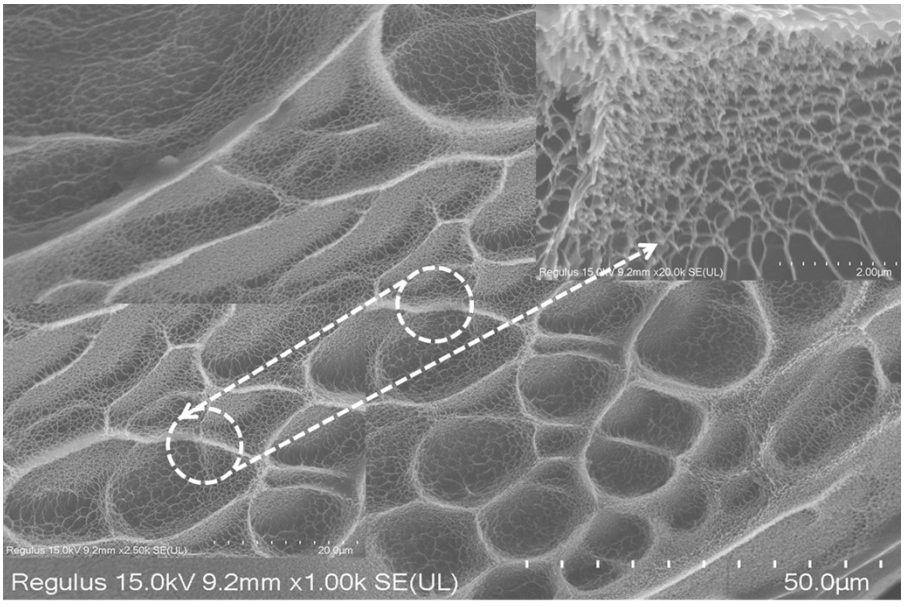

Fig.S6. SEM of hydrogel network with calcium concentration of 3.313wt%.

Tab.S5. Summary of SD values in Fig.5a, Week-1-48 Indicates the layer 48 SD value of the first entity mode in the first Week.

	SD (HU)	
	square 1-1	round1-1
Week-1-48	58.29	55.95
Week-1-88	56.53	55.96
Week-1-128	58.59	57.1
Week-1-168	58.5	56.14
Week-1-208	56.4	56.8

Tab.S6. Summary of SD values in Fig.5b, Week-2-48 Indicates the layer 48 SD value of the first entity mode in the second Week

SD (HU)	SD (HU)	SD (HU)
	square 1-1	round1-1
Week-2-48	54.16	56.11
Week-2-88	52.51	55.27
Week-2-128	55.98	54.22
Week-2-168	55.84	54.48
Week-2-208	56.73	54.44

Tab.S7. Summary of SD values in Fig.5c, Week-3-48 Indicates the layer 48 SD value of the first entity mode in the third Week

	SD (HU)	
	square 1-1	round1-1
Week-3-48	55.36	53.37
Week-3-88	54.25	55.06
Week-3-128	56.09	54.77
Week-3-168	54.49	55.55
Week-3-208	55.49	55.71

Tab.S8. Summary of SD values in Fig.5d, Phantom1-1 represents the SD value of the first module in the first week

	Phantom 1-1	Phantom 1-2	Phantom 1-3	Phantom 1-4	Phantom 1-5
	57.662	57.672	57.786	58.88	59.94
SD	56.39	57.808	56.486	56.512	54.944
	58.472	57.986	58.708	57.886	58.8
	54.974	58.03	57.734	55.202	55.894

Tab.S9. Summary of SD values in Fig.5e, Phantom2-1 represents the SD value of the first module in the second week

	Phantom 2-1	Phantom 2-2	Phantom 2-3	Phantom 2-4	Phantom 2-5
	55.044	55.362	55.538	57.728	56.946
SD	54.44	54.8	55.22	55.96	53.71
	55.748	55.848	55.582	55.646	56.368
	53.846	56.436	57.73	53.764	54.072

Tab.S10. Summary of SD values in Fig.5f, Phantom3-1 represents the SD value of the first module in the third week

	Phantom 3-1	Phantom 3-2	Phantom 3-3	Phantom 3-4	Phantom 3-5
	55.136	54.658	55.416	56.2	58.426
SD	54.892	54.894	54.76	55.84	53.478
	55.418	55.672	55.6	54.86	55.872
	53.644	54.43	53.212	53.636	54.984