Supplementary data

Supplementary table 1. Fragmentation behavior of several precursor ions observed in the ESI spectra of the h5e peptide (M).

Supplementary table 2. Fragmentation behavior of several precursor ions observed in the ESI spectra of the h9e peptide (M).

Supplementary figure 1. SEM images of h9e Ca2+ (a) and acidic (b) hydorgel.

Supplementary figure 2. G' of h9e Ca^{2+} hydrogels with different molar ratio of Ca^{2+} to peptide. (Molar ratio of Ca2+ to h9e: 0.1 (black), 1 (red), 10 (blue), 100 (green))

Supplementary figure 3. physical properties of h9e hydrogel in Zn^{2+} , Na^{+} and Mg^{2+} solutions. a. G' of h9e Zn2+ (blue), Na+ (black) and Mg2+ (red) hydrogels. (peptide concentration 0.005M) **b.** Temperature profile test of h9e Na2+ hydrogel. (Temperature: black: 5 ℃, red: 20 ℃, blue: 37 ℃, yellow: 50 ℃, green: 75 ℃, purple: 90℃) **c.** G' and G'' values of h9e Na+ hydrogel under 4 amplitude sweep shear circles, time interval between each cycle was 10, 20 and 30 s, respectively (black: G'; red: G''). **d.** G' and G'' values of h9e Mg2+ hydrogel under 4 amplitude sweep shear circles, time interval between each cycle was 10 s, 1 min and 5 min, respectively (black: G'; red: G''). **e.** G' and G'' values of h9e Zn2+ hydrogel under 4 amplitude sweep shear circles, time interval between each cycle was 10 s, 1 min and 5 min, respectively (black: G'; red: G'').

Supplementary table 1.

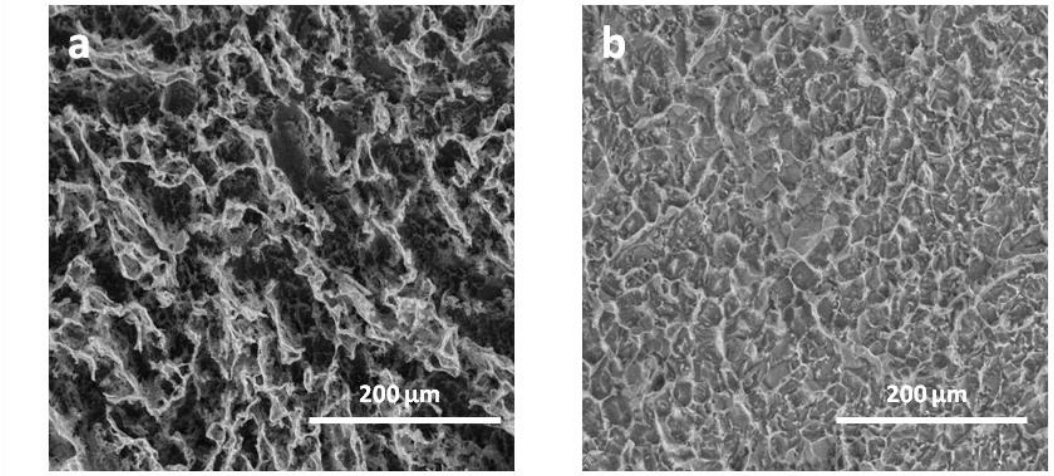
Precursor		$[M+H+Ca]^{3+}$ (m/z 469.891)		$[M+2Ca-H]^{3+}$ (m/z 482.54)		$[M+Ca]^{2+}$ (m/z 704.33)	
Fragments		*N-terminal*	*C-terminal*	*N-terminal*	*C-terminal*	*N-terminal*	*C-terminal*
1	F						
2	L	**a_2; b_2** [a)]	$[y_{14}-H+Ca]^{2+}$	**a_2; b_2**	$[y_{14}-3H+2Ca]^{2+}$	a_2	
3	I	b_3	**$[y_{13}-H+Ca]^{2+}$**		**$[y_{13}-3H+2Ca]^{2+}$** $[y_{13}-3H+2Ca-H2O]^{2+}$	b_3	
4	V		**$[y_{12}-H+Ca]^{2+}$**		$[y_{12}-3H+2Ca]^{2+}$	a_4; b_4	$[y_{12}-H_2O-2H+Ca]^{+}$
5	I						$[y_{11}-H_2O-2H+Ca]^{+}$
6	G		$[y_{10}-H+Ca]^{2+}$				$[y_{10}-2H+Ca]^{+}$ $[y_{10}-H_2O-2H+Ca]^{+}$
7	P						$[y_9-H_2O-2H+Ca]^{+}$
8	G					$[b_8-2H+Ca]^{+}$	
9	G			**$[c_9-H+Ca]^{2+}$**		**$[c_9-H+Ca]^{2+}$** $[c_9-2H+Ca]^{+}$	
10	D					**$[b_{10}-H+Ca]^{2+}$** $[a_{10}-H+Ca]^{2+}$ **$[b_{10}-2H+Ca]^{+}$** $[c_{10}-2H+Ca]^{+}$	
11	G					$[b_{11}-2H+Ca]^{+}$	**y_5** **$[y_5-H+Ca]^{+}$**
12	P					$[b_{12}-H+Ca]^{2+}$	y_4
13	G	$[b_{13}-H+Ca]^{2+}$				$[b_{13}-H+Ca]^{2+}$	
14	G	$[b_{14}-H+Ca]^{2+}$				**$[b_{14}-H+Ca]^{2+}$** $[a_{14}-H+Ca]^{2+}$	
15	D						

a) Abundant fragments are shown in bold.

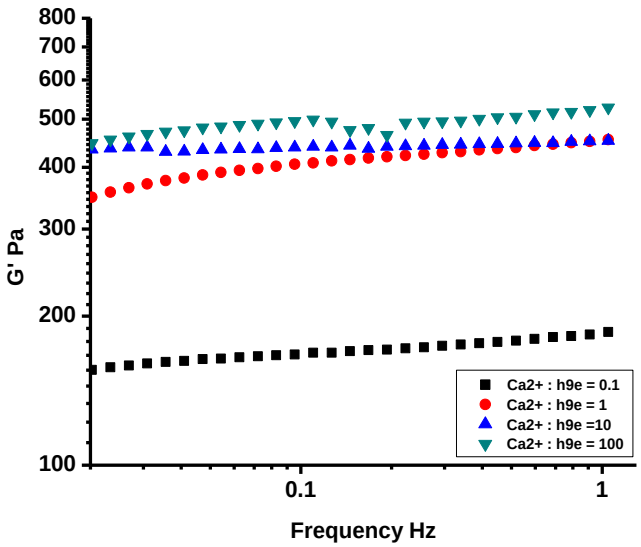
Supplementary table 2.

Precursor		$[M+2Ca-H]^{3+}$ (m/z 605.948)		$[M+H+Ca]^{3+}$(m/z 593.299)		$[M+Ca]^{2+}$ (m/z 889.444)		$[M+2Ca]^{4+}$ (m/z 454.713)	
Fragments		*N-terminal*	*C-terminal*	*N-terminal*	*C-terminal*	*N-terminal*	*C-terminal*	*N-terminal*	*C-terminal*
1	F								
2	L	**a_2; b_2**	$[y_{18}+2Ca-3H]^{2+}$	**a_2; b_2**	$[y_{18}+Ca-H]2+$			a_2	
3	I	b_3	**$[y_{17}+2Ca-3H]^{2+}$**	b_3	**$[y_{17}+Ca-H]2+$ $[z_{17}+Ca-2H]2+$**	b_3		b_3	
4	V	b_4	**$[y_{16}+2Ca-3H]^{2+}$**	b_4	**$[y_{16}+Ca-H]2+$**	b_4		a_4; **b_4**	$[y_{16}+2Ca-3H]^{2+}$
5	I		**$[y_{15}+2Ca-3H]^{2+}$**		$[y_{15}+Ca-H]2+$				$[y_{15}+2Ca-3H]^{2+}$
6	G		$[y_{14}+2Ca-3H]^{2+}$						$[y_{14}+2Ca-2H]^{3+}$ $[y_{14}+2Ca-3H-H_2O]^{2+}$ **$[y_{14}+2Ca-3H]^{2+}$**
7	**S**							$[a_7+Ca-3H]^{2+}$ **$[a_7+Ca-H]^{2+}$** **$[b_7+Ca-H]^{2+}$**	$[y_{13}+2Ca-3H]^{2+}$
8	I								$[y_{12}+Ca-H]^{2+}$ $[y_{12}+2Ca-3H]^{2+}$
9	I								
10	G							**$[b_{16}-H+Ca]^{2+}$**	
11	P								
12	G								
13	G					$[a_{13}+Ca-H]^{2+}$ $[b_{13}+Ca-H]^{2+}$ $[c_{13}+Ca-H]^{2+}$			
14	D					**$[b_{14}+Ca-H]^{2+}$** $[b_{14}+Ca-H-H_2O]^{2+}$		$[b_{14}-H+Ca]^{2+}$	
15	G					$[b_{15}+Ca-H]^{2+}$			**$[y_5+Ca-H]^{2+}$**
16	P								
17	G								
18	G					$[b_{18}+Ca-H]^{2+}$			
19	D								

Supplementary figure 1



Supplementary figure 2



Supplementary figure 3