Supplementary Materials

A Versatile Dynamic Hydrogel Integrating pH-Responsive Visual Detection and Antimicrobial functions for Infected Wound Management

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Experimental Section

Swelling Behavior of the PFPU/VCM/BTB Hydrogel

The swelling performance of the PFPU/VCM/BTB hydrogel was evaluated by a gravimetric method. Freshly prepared wet hydrogel samples (W_0) were weighed and immersed in phosphate-buffered saline (PBS, pH 7.4) at 37 °C. At predetermined time intervals (2, 4, 6, 8, and 10 h), the samples were removed, gently blotted with filter paper to remove excess surface water, and weighed (W_t); they were then returned to the immersion medium. The swelling ratio was calculated using the following equation:

$$\text{Swelling Ratio } \% = \frac{W_t - W_0}{W_0} \times 100\%$$

All measurements were performed in triplicate.

Rationale for selecting the VCM concentration

To determine the VCM concentration, we conducted a preliminary antibacterial concentration screening at 10, 20, 40, and 60 μg/mL. As shown in Figure S1, the visible colonies on the treated plates gradually decreased with increasing VCM concentration, the colonies were markedly reduced at 40 μg/mL, and only very few colonies were observed at 60 μg/mL. Therefore, a working concentration of 50 μg/mL was finally employed in this study, and its antibacterial efficacy was evaluated in the subsequent composite hydrogel experiments.

Formulation	PF127-$(CHO)_2$ (wt%)	PMUA (wt%)	VCM (w/v)	BTB (w/v)	Volume ratio	G′ (Pa)
PFPU1	25 wt%	8 wt%	0	0	1:1	338.605
PFPU2	30 wt%	8 wt%	0	0	1:1	447.566
PFPU3	35 wt%	8 wt%	0	0	1:1	596.572
PFPU/VCM/BTB	35 wt%	8 wt%	0.005%	0.05%	1:1	

Table S1. Formulation of hydrogel.

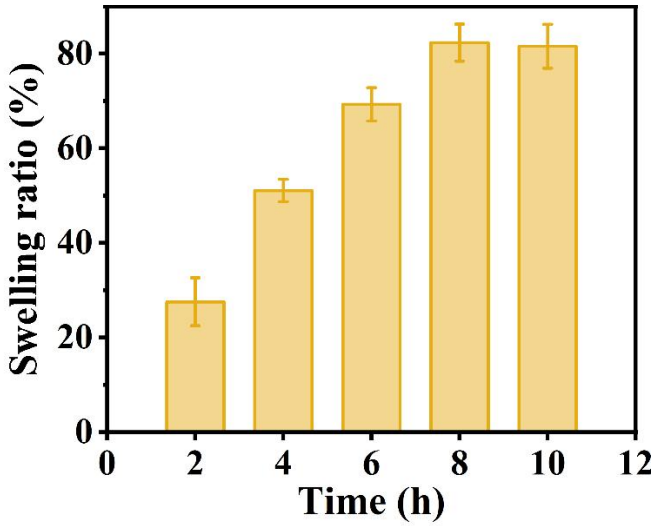


Figure S1. Swelling characteristics of hydrogel.

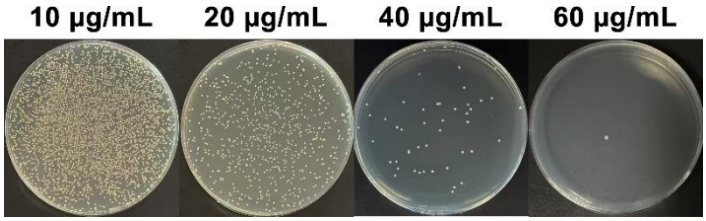


Figure S2. Bacterial culture images of the hydrogels with different VCM concentrations.