Fig. S1

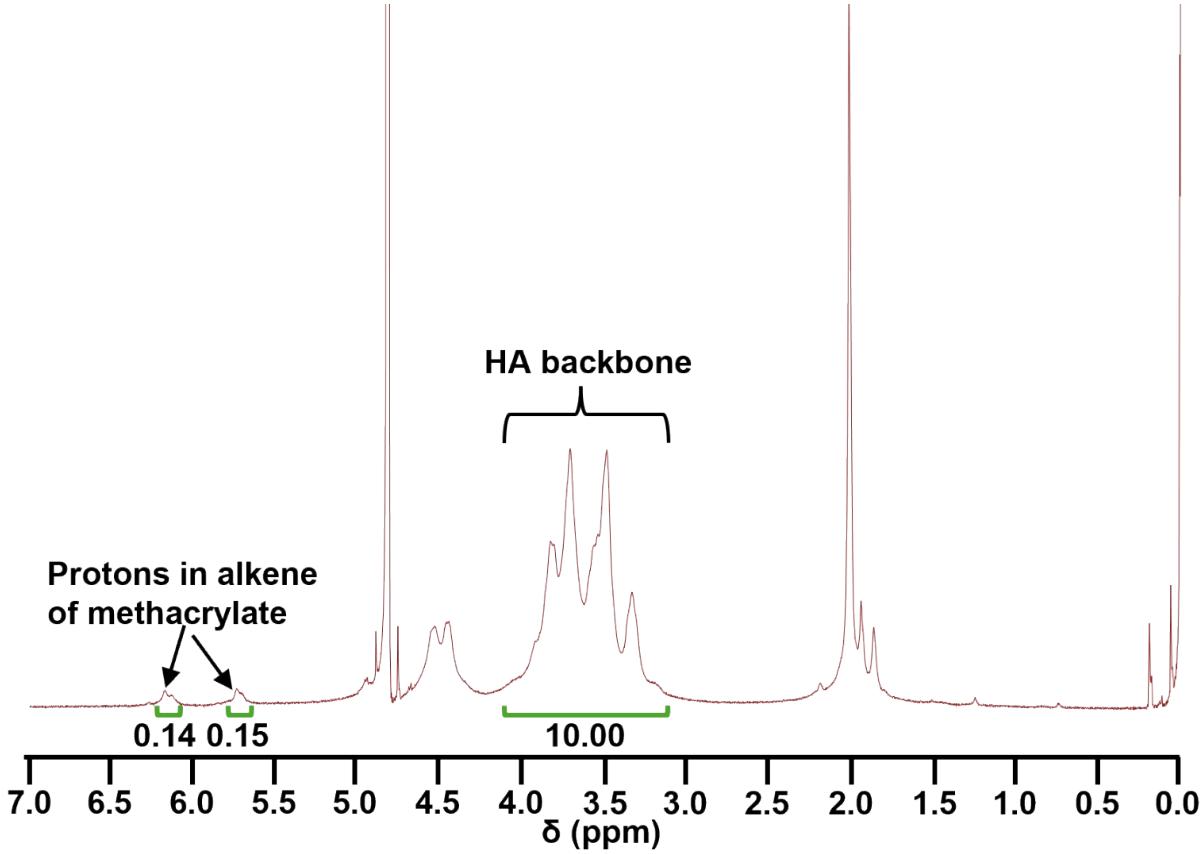

Fig. S1 ^{1}H NMR spectra of HAMA. Values below the peak indicate integral of each peak.

Fig. S2

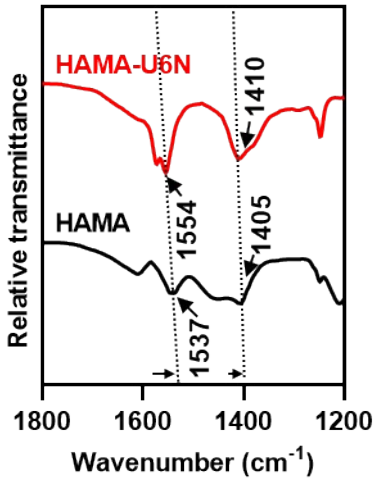

Fig. S2 FT-IR spectra of HAMA (black) and HAMA-U6N (red) in D_2O

Fig. S3

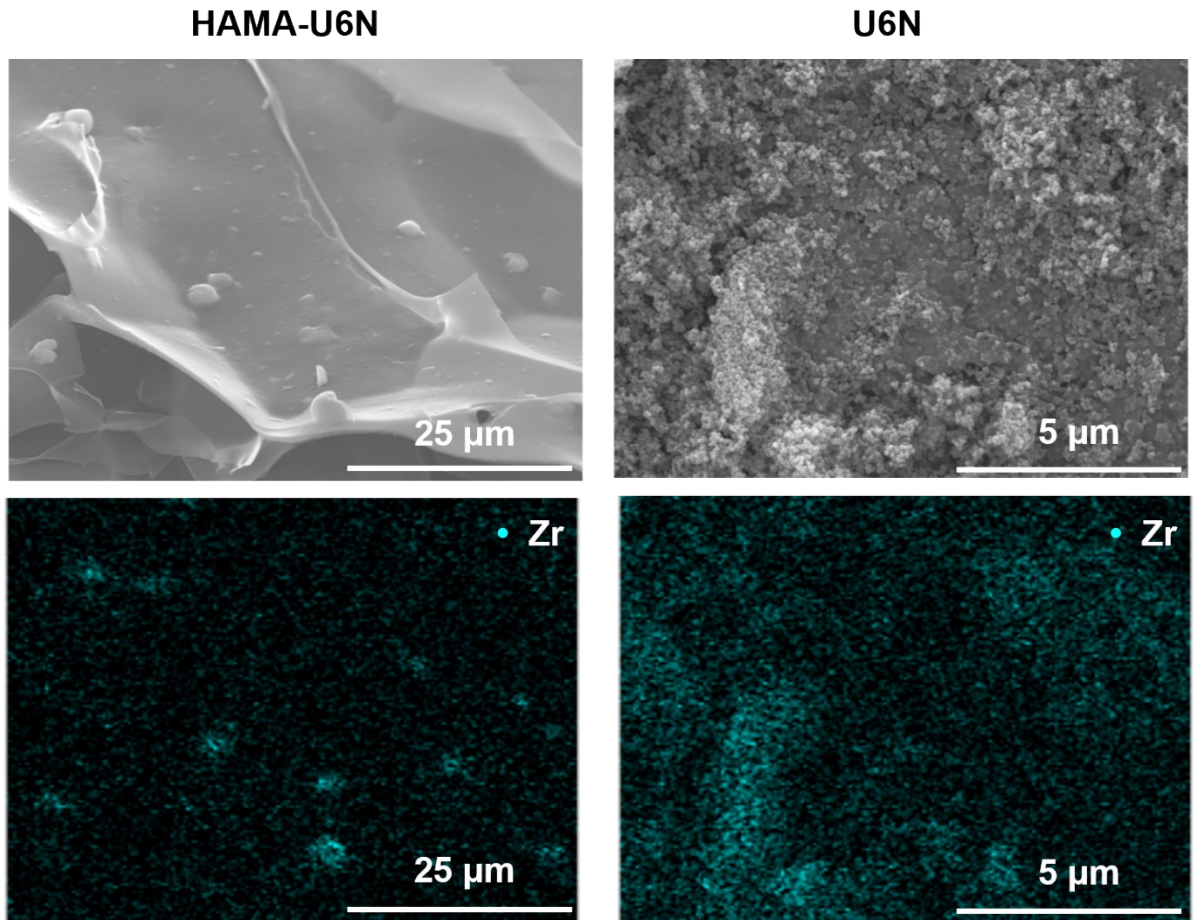

Fig. S3 SEM images and EDS mapping of Zr in SEM images of HAMA-U6N and U6N respectively. Light blue clusters indicate zirconium.

Fig. S4

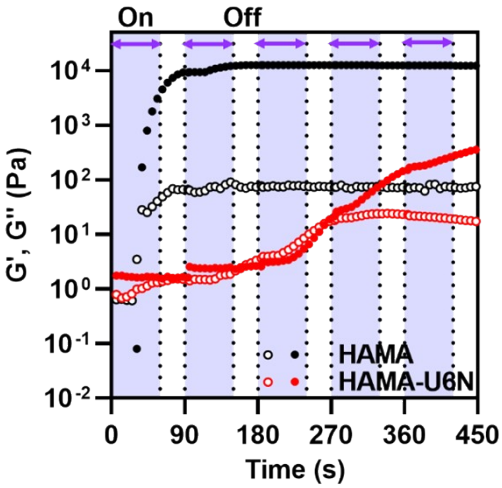

Fig. S4 Rheological analysis of HAMA (black) and HAMA-U6N (red) during UV on (60 seconds, purple) and off (30 seconds) cycles.

Fig. S5

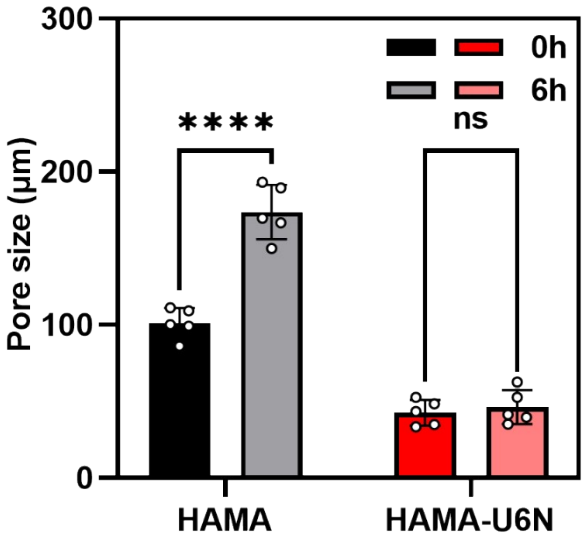

Fig. S5 Pore size of freeze-dried HAMA and HAMA-U6N before swelling (HAMA: black, HAMA-U6N: red) and swollen for 6 hours (HAMA: grey, HAMA-U6N: pink) respectively. Statistical significance was determined by One-way ANOVA followed by Tukey's post hoc test. ****P < 0.0001, and ns for "not significant".

Fig. S6

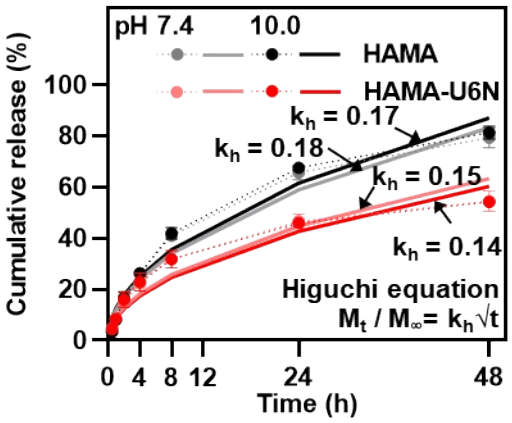

Fig. S6 *In vitro* release profiles of quercetin from HAMA (grey for pH 7.4 and black for pH 10.0), HAMA-U6N (pink for pH 7.4 and red for pH 10.0) hydrogels and fitted curve calculated with Higuchi model ($M_t / M_\infty = k_h\sqrt{t}$), where M_t and M_∞ each indicates amount released at time t and total releasable amount. k_h indicates apparent Higuchi rate constant. Each solid line indicates the fitted curve.

Fig. S7

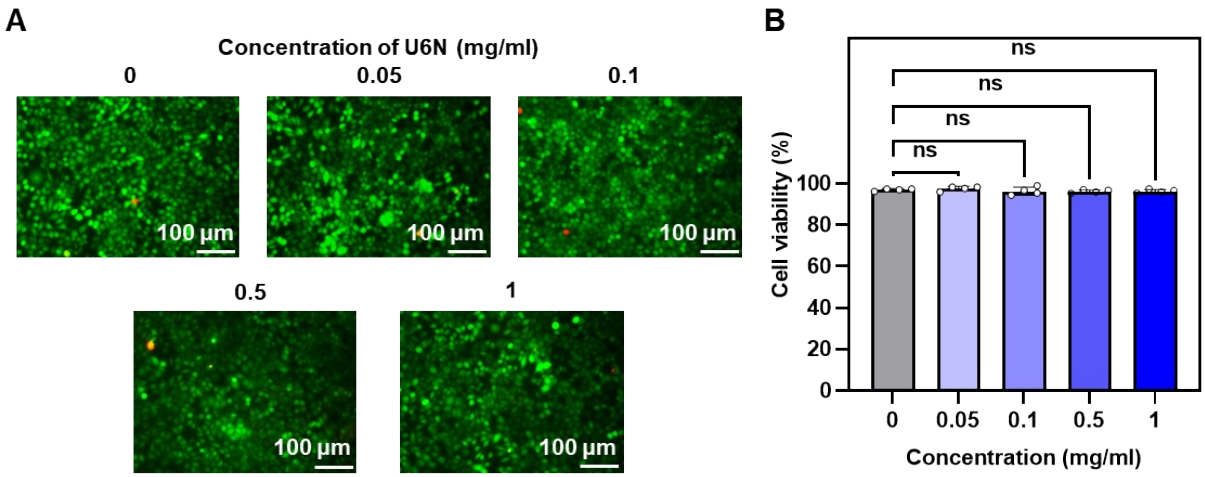

Fig. S7 (A) Live/dead fluorescence staining of L929 cells after 24 h incubation. (scale bar = 500 µm) (B) Quantification of cell viability (%) based on live/dead assay of U6N concentrations of 0, 0.05, 0.1, 0.5, 1 mg/mL. Statistical significance was determined by one-way ANOVA and Tukey's post hoc test. ns denotes "not significant".

Fig. S8

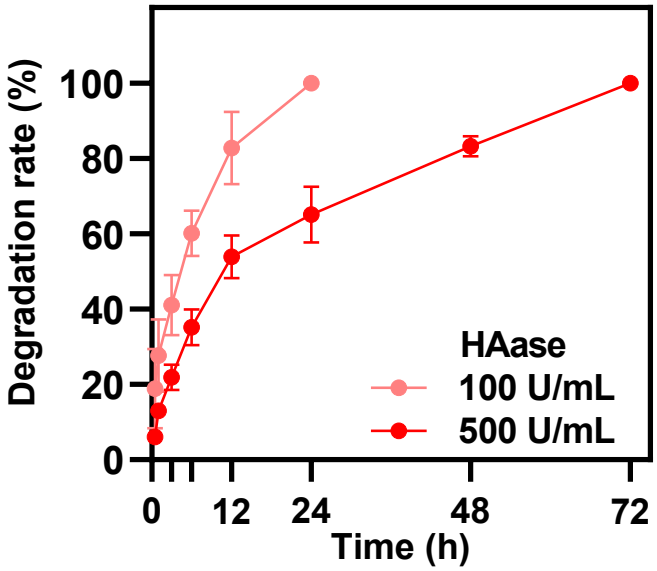

Fig. S8 Degradation rate of HAMA-U6N under HAase condition (100 U/mL for pink and 500 U/mL for red) over 72 h (*n* = 4).

Fig. S9

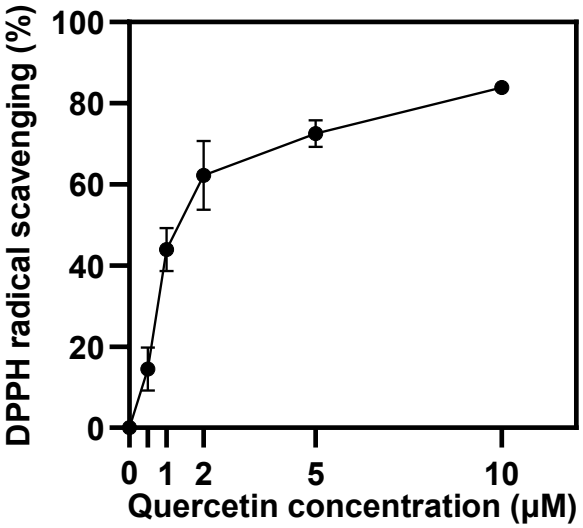

Fig. S9 Radical scavenging ability of quercetin concentrations of 0.5, 1, 2, 5, 10 μM (*n* = 5).

Fig. S10

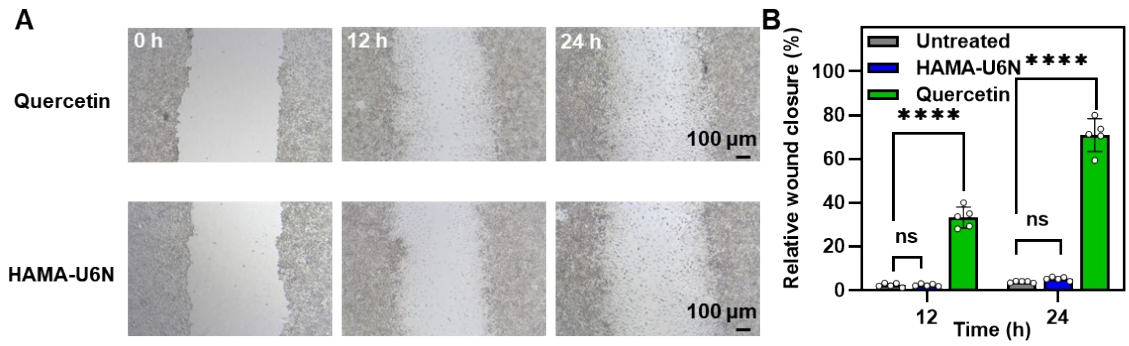

Fig. S10 (A) OM images of wound-scratch assay at 0, 12, and 24 h for each treatment group (Untreated, HAMA-U6N, Quercetin) (scale bar = 100 µm). (B) Quantification of wound closure (%) after 12 and 24 h in untreated (grey), HAMA-U6N (blue), and Quercetin (green) groups (*n* = 5). Statistical significance was determined by one-way ANOVA and Tukey's post hoc test. ****P < 0.0001, ns denotes "not significant".