

## **Supplementary Information**

# ZnO quantum dots-embedded collagen/polyanion composite hydrogels with integrated functions of degradation tracking/inhibition and gene delivery

Yuan Liu, Jianhai Yang, Peng Zhang, Changjun Liu, Wei Wang, Wenguang Liu \*

*School of Materials Science and Engineering, Tianjin Key Laboratory of Composite and Functional Materials, Tianjin University, Tianjin 300072, P. R. China*

## Physical and mechanical characterization

**Optical properties.** The visible light transmission of the flat hydrogels entrapping ZnO QDs (thickness 400  $\mu\text{m}$ , soaked in normal saline) was measured at wavelength 500 nm using a Synergy HT Multi-Mode Microplate Reader (BioTek, USA) at room temperature.

**Equilibrium water content (EWC).** Hydrogels were fully equilibrated in normal saline, surface-dried with filter papers, and then immediately weighed on a microbalance to measure the wet weight. These same hydrogels were freeze-dried under a vacuum to constant weight. Equilibrated water content was defined as:

$m_{\text{eq}} = (m_{\text{wet}} - m_{\text{dry}}) / m_{\text{wet}} \times 100\%$ , where  $m_{\text{wet}}$  and  $m_{\text{dry}}$  denote wet weight and dry weight of hydrogels, respectively. The average values of three measurements were taken for each sample.

**Mechanical properties.** Tensile strength, elastic modulus, and elongation at break of hydrogels were measured on WDW-05 electromechanical tester (Time Group Inc, China) at room temperature. Flat hydrogels were fully equilibrated in normal saline and cut into rectangular pieces with 20 mm  $\times$  2 mm  $\times$  0.40 mm dimensions. Gauge length and crosshead speed were set as 10 mm and 100 mm  $\text{min}^{-1}$ , respectively. At least three specimens were tested for each hydrogel sample.

---

\*To whom correspondence should be addressed  
E-mail: wgliu@tju.edu.cn