

Electronic Supplementary Information

Shear-thinning Tetronic-adamantane/poly(β -cyclodextrin) hydrogels as injectable biomaterials

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Materials and Methods

Calculation of molar ratio between Ada and β -CD

The molar ratio of Ada and β -CD was calculated by the following equations:

MW of Tet-Ada monomer = 18709.00 g/mol

MW of dimer in poly(β -CD) = 2326.03 g/mol

Mol of Ada in Tet-Ada = mol of Tet-Ada \times 4

$$\text{Mol of Ada in 4 g of Tet-Ada} = 4 \text{ g} \times \frac{1 \text{ mol}}{18709.00 \text{ g}} \times 4$$

$$\text{Mol of } \beta\text{-CD in 1 g of poly}(\beta\text{-CD}) = \frac{1 \text{ g} \times \frac{1 \text{ mol}}{2326.03}}{2} \text{ g}$$

Molar ratio of Ada: β -CD = 8.55×10^{-4} : 8.60×10^{-4}

Measurement of Tetronic (Tet) micelles

To determine the formation of Tet micelles, we measured the micelle size and size distribution using the Zetasizer Nano ZS (ZEN 3600, Malvern Instruments, Malvern, UK) at 25 and 37 °C. Tet solution was prepared in DIW at a concentration of 3 wt%. Prior to the measurement, the samples were filtered using a syringe filter (pore size of 0.45 μ m) and sonicated for 10 min.

Characterization of the porous structure of hydrogels

The porous structure of hydrogels were performed using a scanning electron microscopy (FE-SEM; JSM 7100F, JEOL, Tokyo, Japan). Briefly, we fabricated 300 μ L of hydrogels in 1.5 mL microtubes at different pH (6.2 and 7.4) at 37 °C. Then, the samples were cut along the longitudinal section and lyophilized. The morphology of freeze-dried hydrogels was observed after sputter-coating with gold.

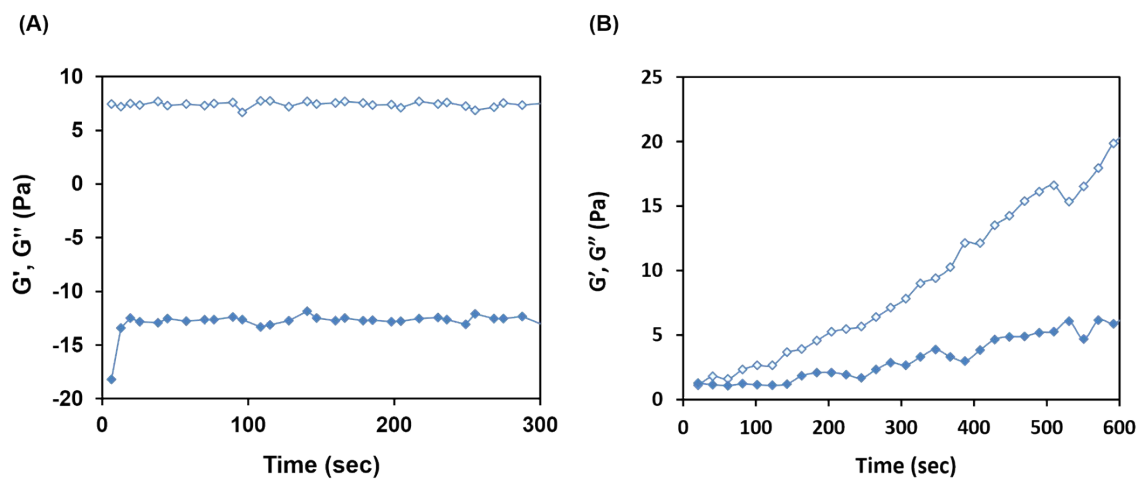


Figure S1. Oscillatory time sweep of Tet solution at 25 °C (A) and 37 °C (B). Storage modulus (G' , solid fill) and loss modulus (G'' , no fill) were measured at 10 Hz, 1% strain.

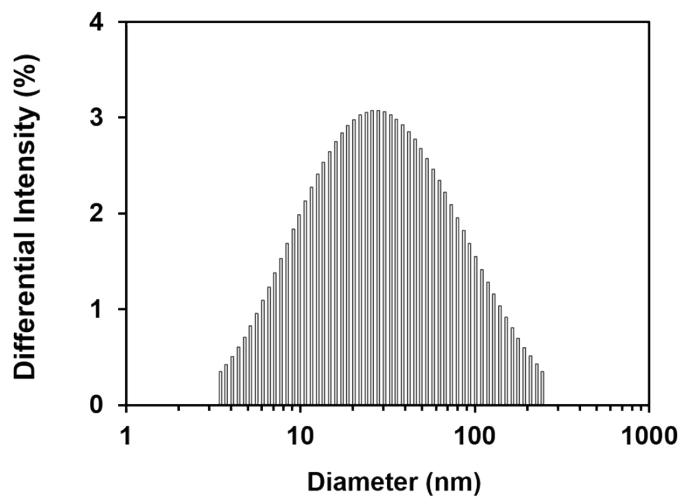


Figure S2. Size distribution of Tet micelles at 37 °C. The average diameter of micelles is 49.4 nm and the polydispersity index (PI) is 0.082.

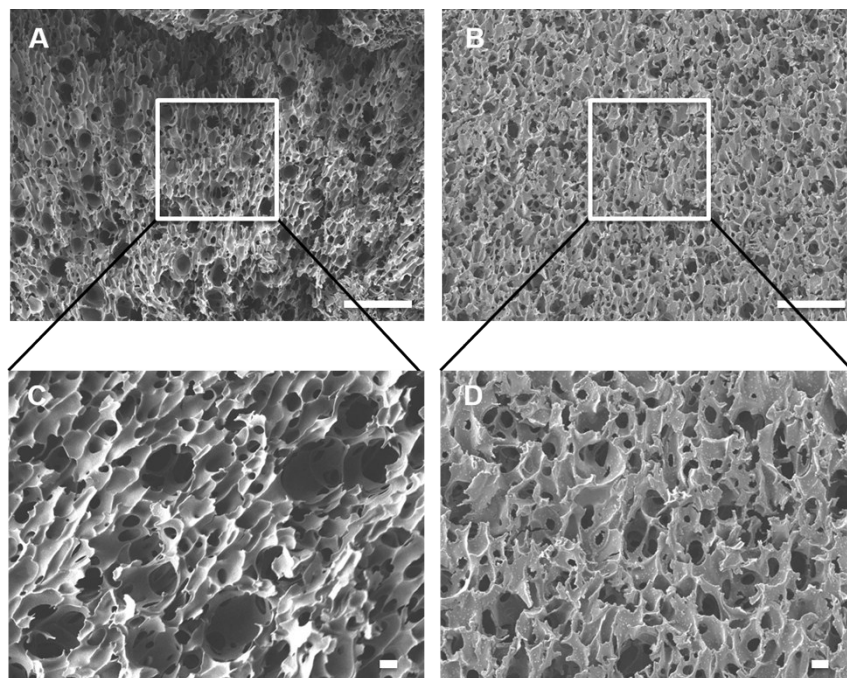


Figure S3. The inner pore structure of Tet-Ada/poly(β -CD) hydrogels made from different media, pH 6.2 (A, C) and pH 7.4 (B, D). The scale bars represent 100 μm (A, B) and 10 μm (C, D).