SUPPORTING INFORMATION

Effects of amphiphilic block copolymers on the equilibrium lactone fractions of camptothecin analogues at different pHs

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1. Phase diagram of F127 PBS solutions

The phase diagram was determined by the vial-inverting method. Briefly, 0.8 mL sample solutions were added into the tube in water bath. The equilibrium temperature was started at 10 °C with the increasing rate 1 °C per 15 min. The gel state was defined as no flow of the sample within 30 s.

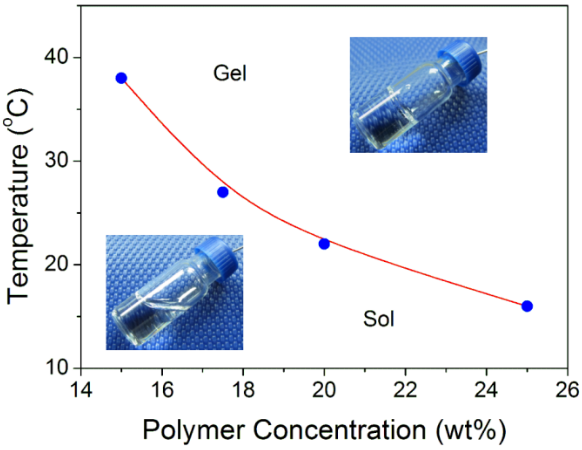

Fig. S1 Phase diagram of the F127/PBS system determined by the vial-inverting method.

2. Deduction of pH_{opt}

For Henderson-Hasselbalch (HH) equation

$$f(\mathrm{pH}) = f_{\infty} + \frac{f_{-\infty} - f_{\infty}}{1+10^{n(\mathrm{pH}-\mathrm{pH}_{1/2})}},$$

we just discussed the simplest case with $n = 1$ and $f_{-\infty} - f_{\infty} = 1$. After denoting $x = \mathrm{pH}$, $a = \mathrm{pH}_{1/2,\mathrm{PBS}}$ and $b = \mathrm{pH}_{1/2,\mathrm{polymer}}$, we obtained

$$y = \Delta f_{\mathrm{lactone}} = f_2(x) - f_1(x) = \frac{1}{1+10^{(x-b)}} - \frac{1}{1+10^{(x-a)}}$$

So,

$$\frac{\mathrm{d}y}{\mathrm{d}x} = f_2'(x) - f_1'(x) = \frac{-(\ln 10)10^{(x-b)}}{[1+10^{(x-b)}]^2} - \frac{-(\ln 10)10^{(x-a)}}{[1+10^{(x-a)}]^2}$$

This equation was reduced as

$$y'/\ln 10 = \frac{1}{\frac{1}{10^{(x-a)}} + 2 + 10^{(x-a)}} - \frac{1}{\frac{1}{10^{(x-b)}} + 2 + 10^{(x-b)}}$$

In the case of the optimal pH, $y' = 0$. Considering $a \neq b$, so

$$\frac{1}{10^{(x-a)}} = 10^{(x-b)}$$

Resolving this equation led to

$$x = \frac{1}{2}(a+b)$$

That is equation (5) in the main manuscript

$$\mathrm{pH}_{\mathrm{opt}} = \frac{1}{2}(\mathrm{pH}_{1/2,\mathrm{PBS}} + \mathrm{pH}_{1/2,\mathrm{polymer}})$$