

## Supporting Information

### The fabrication of amphiphilic double dynamers for the responsive Pickering emulsifiers

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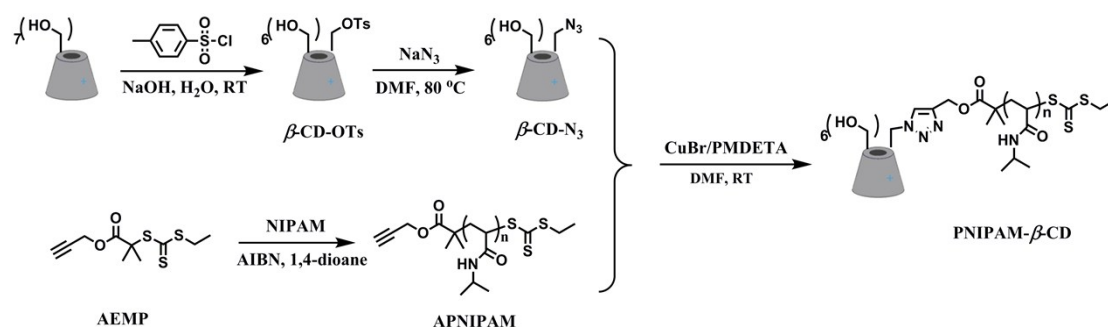
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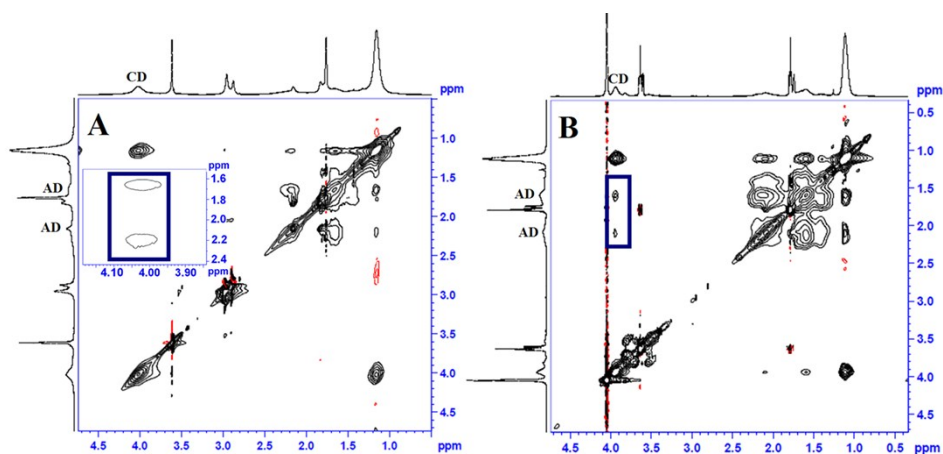
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### S1. The synthesis route of PNIPAM- $\beta$ -CD



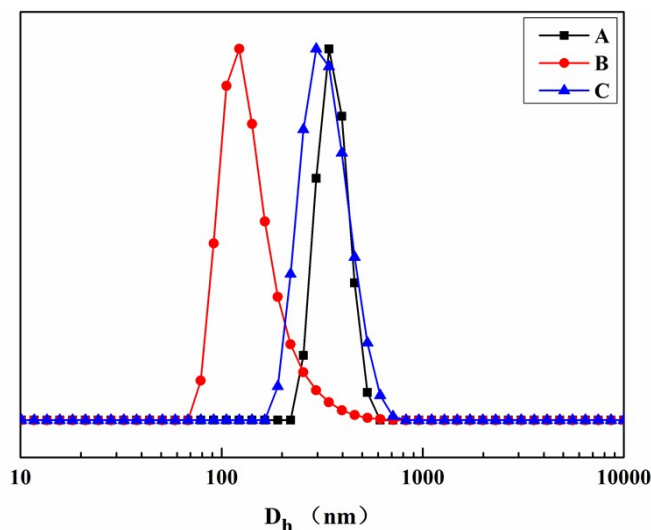
### S2. The <sup>1</sup>H NMR proof for the formation of the inclusions



**Fig. S1.** 2D <sup>1</sup>H NOESY spectra of the PNIPAM- $\beta$ -CD host and PMMA-*b*-PAMPMA guest in different media: ((A) *d*<sub>4</sub>-THF, (B) the mixture of *d*<sub>4</sub>-THF and D<sub>2</sub>O (*d*<sub>4</sub>-THF/D<sub>2</sub>O = 10:1 (v/v))

A weak NOESY cross-peak between the  $\beta$ -CD and the AD was monitored in *d*<sub>4</sub>-THF, however, a strong NOESY cross-peak signal occurred at  $\delta = 1.60$ -2.16 ppm was observed in the *d*<sub>4</sub>-THF/D<sub>2</sub>O (v/v, 10:1).

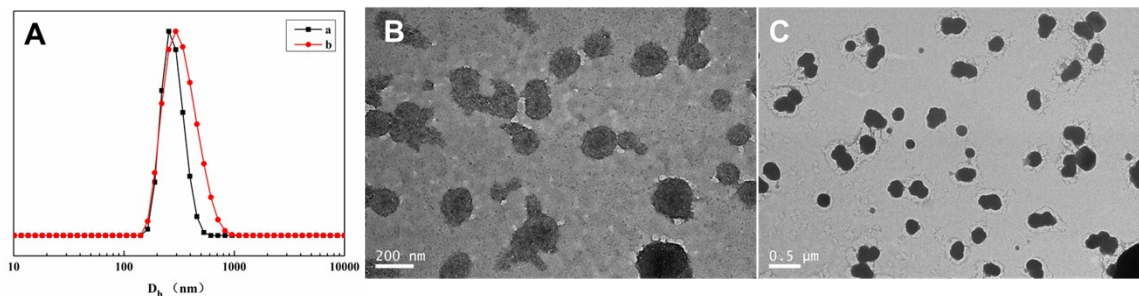
**S3. DLS traces of polymer particles in different media (A: THF/water (1:1, v/v) before dialysis; B: pure water; C: THF/water (1:1, v/v))**



**Fig. S2.** DLS traces of polymer particles in different solvents, A: THF/water (1:1, v/v) before dialysis; B: pure water; C: THF/water (1:1, v/v)

The average size of the aggregates was about 360 nm in the THF/H<sub>2</sub>O mixture with 50% of water content (trace A). After the complete removal of THF by dialysis against the water, the final size of the aggregates was about 145 nm in the pure water (trace B). Upon the addition of THF into the dispersion of polymer particles in the pure water, and the final volume fraction of THF reached 50%. After 30 min of gentle stirring at room temperature,  $D_{h,N}$  of the polymer particles was about ~340 nm (trace C), showing a  $D_{h,N}$  very similar to the value before dialysis. This suggested in turn that the remarkable size reduction of polymer particles was mainly ascribed to the shrinking of the core, which was the result of the removal of the good solvent of THF for core during the dialysis.

***S4. Size and morphologies of the polymer particles obtained by self-assembly of the double dynamers under different conditions***



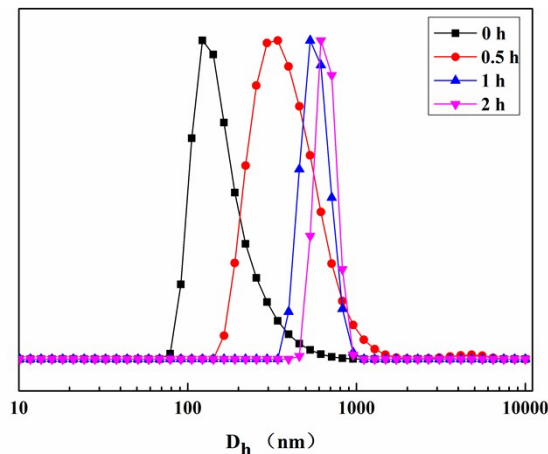
**Fig .S3.** (A) DLS traces and (B and C) TEM images of the polymer particles obtained by self-assembly of the double dynamers under different conditions. Conditions: a and B: mole ratio of  $\beta$ -CD/AD was 0.5 and the  $M_n$  of PNIPAM was 3400 g/mol; b and C: mole ratio of  $\beta$ -CD/AD was 1, and the  $M_n$  of PNIPAM was 9500 g/mol.

***S5. The photos of the morphological transition of the polymer particles in response to the external stimuli***



**Fig.S4.** The photograph of polymer particles in pure water at different conditions: (A) room temperature and pH 7; (B) 38 °C and pH 7; (C) cooling from 38 °C to room temperature and pH 7; (D) room temperature and pH 5

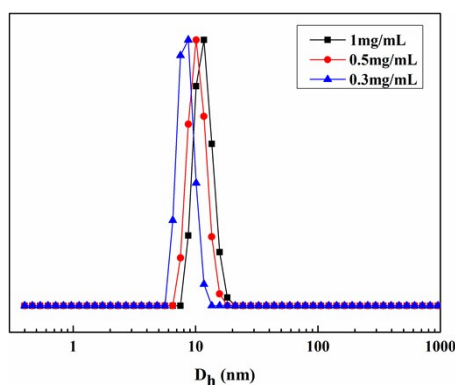
**S6. The variation of the average hydrodynamic diameters ( $D_{h,N}$ ) of polymer particles in water at pH5**



**Fig. S5.** Time-dependence of  $D_{h,N}$  of polymer particles in water solution at pH 5

Upon decreasing the pH value from 7 to 5, the size of the polymer particles showed a remarkable increase within a short time. Finally, the precipitation of polymer was observed.

**S7. The DLS proof for the insolubility of the PMMA-*b*-PAMPMA in xylene**

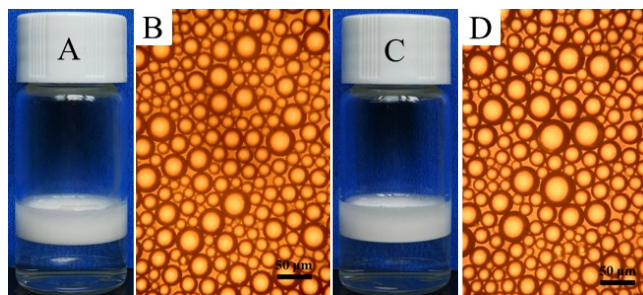


**Fig.S6.** The DLS traces of PMMA-*b*-PAMPMA in xylene at different concentrations

PMMA-*b*-PAMPMA diblock copolymers could not be molecularly dissolved in xylene. DLS measurement indicated that  $D_h$  of PMMA-*b*-PAMPMA at 0.3, 0.5 and 1.0

mg/mL was  $\sim 8.6$ ,  $\sim 10.9$  and  $\sim 11.7$  nm, respectively, which were all remarkably larger than its  $D_h$  of  $\sim 3.1$  nm in THF.

***S8. The emulsifying results of P2 and P3***



***Fig. S7 The photographs of Pickering emulsions and the corresponding optical microscope images of droplets of the Pickering emulsions stabilized by P2 (A, B) and P3 (C, D)***