Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information for

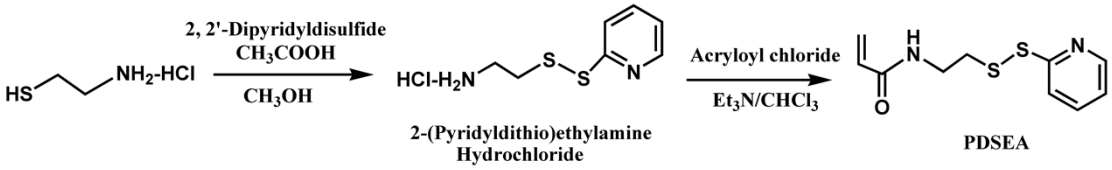
"Reduction" Responsive Thymine-Conjugated Biodynamers: Synthesis and Solution Behaviors

*Lingzhi Liu, Libin Wu, Junyan Tan, Lin Wang, Qing Liu, Pingwei Liu, Li Liu**

Key Laboratory of Functional Polymer Materials, Ministry of Education, Institute of Polymer Chemistry, College of Chemistry, Nankai University, Tianjin 300071, P. R. China. Collaborative Innovation Center of Chemical Science and Engineering (Tianjin), Tianjin 300071, P. R. China.

E-mail: nkliuli@nankai.edu.cn.

Synthesis of Pyridyldisulfide Ethylacrylamide (PDSEA).[1]



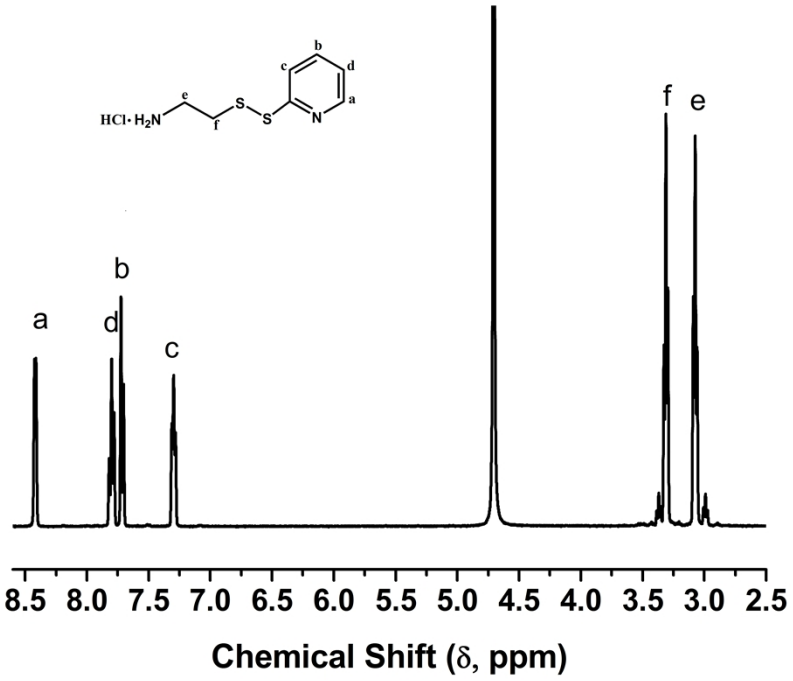


Figure S1. [1]H NMR spectrum of 2-(pyridyldithio)ethylamine hydrochloride.

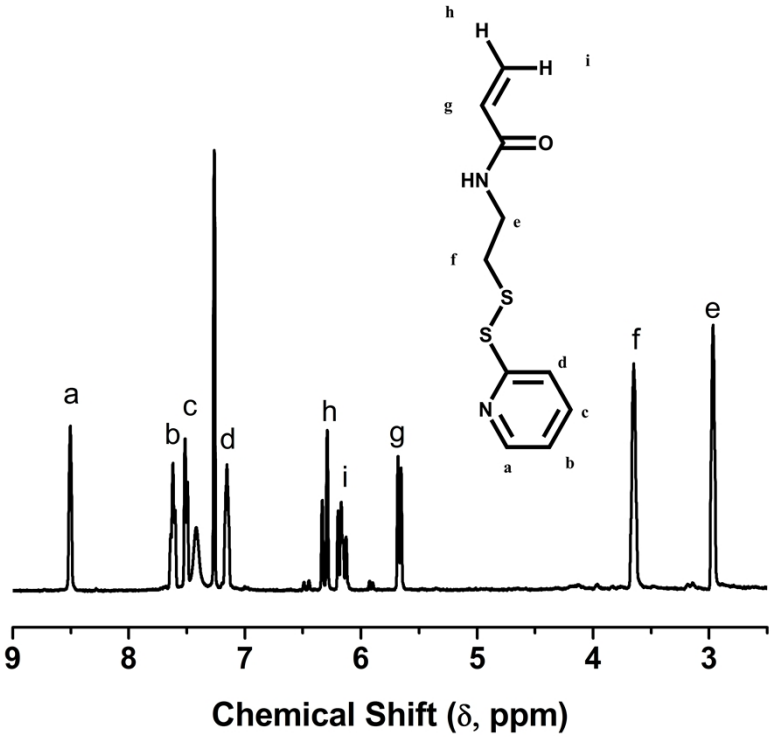
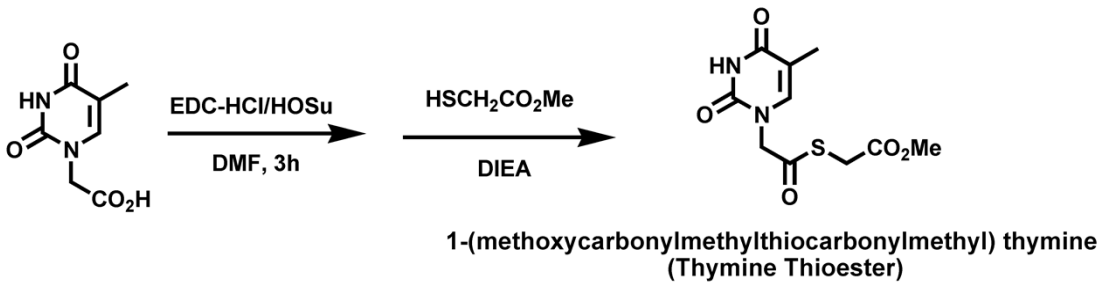


Figure S2. [1]H NMR spectrum of 2-pyridyldisulfide ethylacrylamide (PDSEA).

Synthesis of 1-(Methoxycarbonylmethylthiocarbonylmethyl) Thymine (Thymine Thioester).[2]



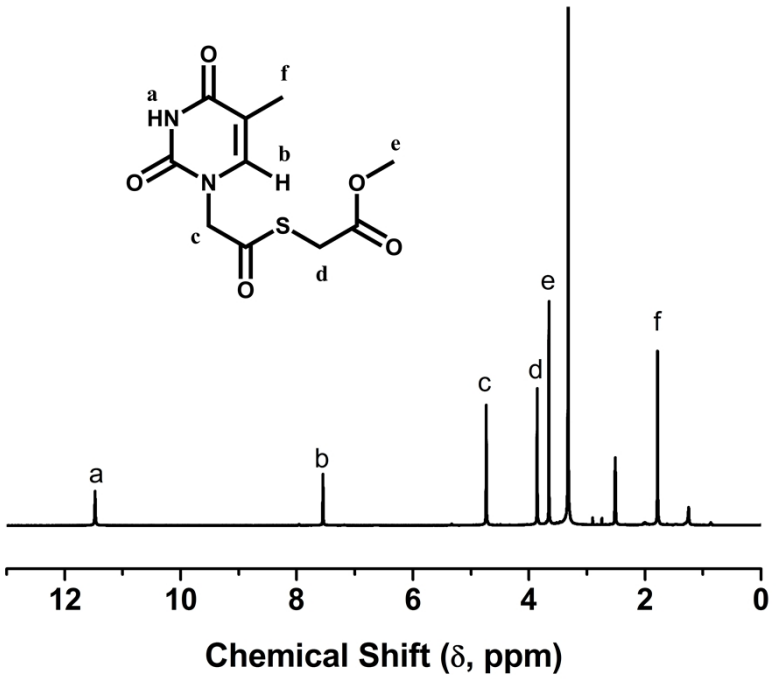
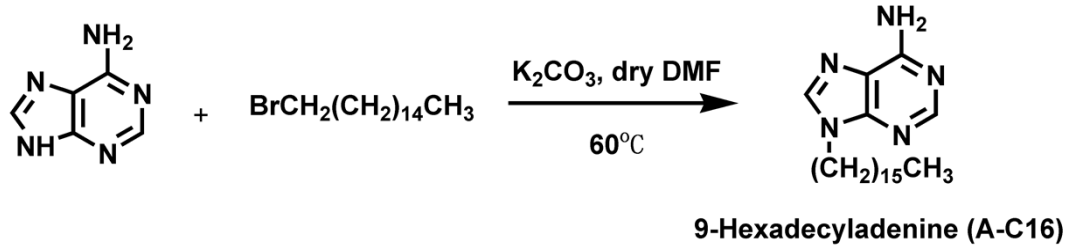


Figure S3. ^{1}H NMR spectrum of thymine thioester.

Synthesis of 9-Hexadecyladenine (A-C16).[3]



9-Hexadecyladenine (A-C16)

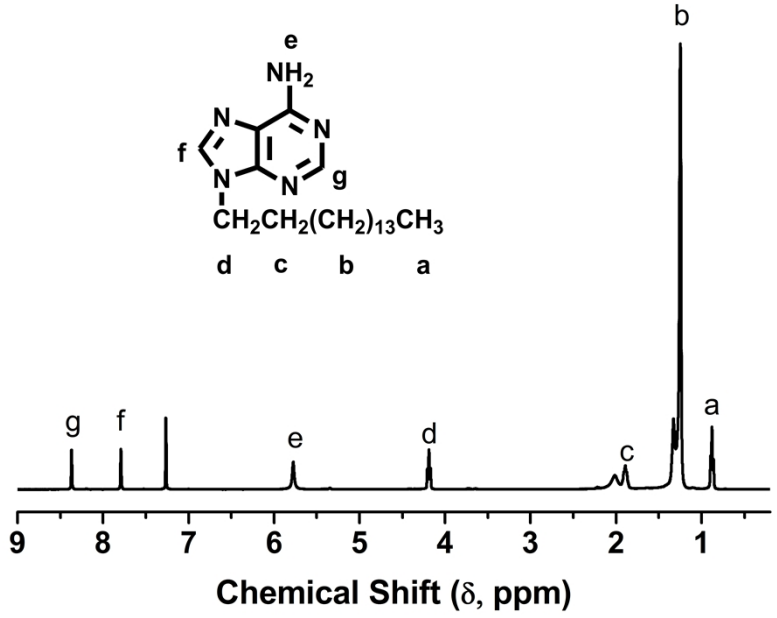


Figure S4. 1H NMR spectrum of 9-hexadecyladenine (A-C16).

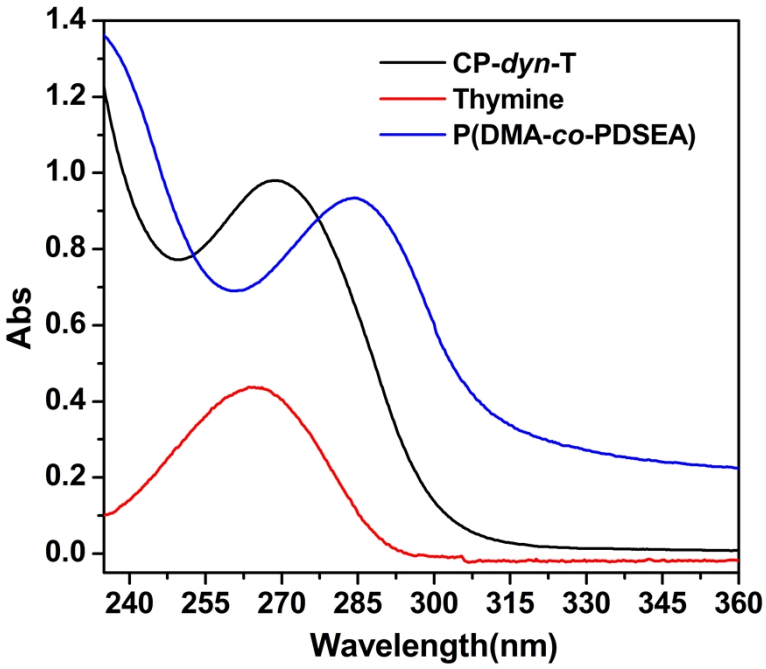


Figure S5. UV−vis spectra of thymine-conjugated biodynamer compared with its precursors and thymine molecule in water.

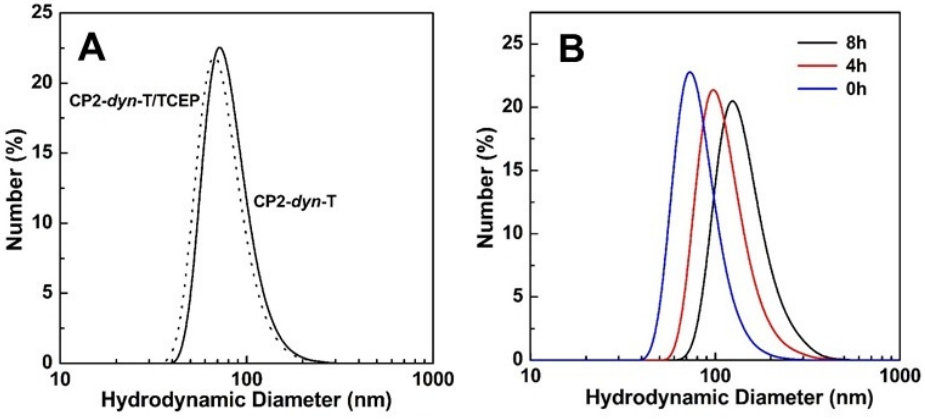


Figure S6. (A) DLS curves of CP2-*dyn*-T before and after incubation with excess TCEP for 24h. (B) DLS curves of CP2-*dyn*-T in the PBS containing 10 mM GSH at specified intervals (pH 7.4, 37 ˚C).

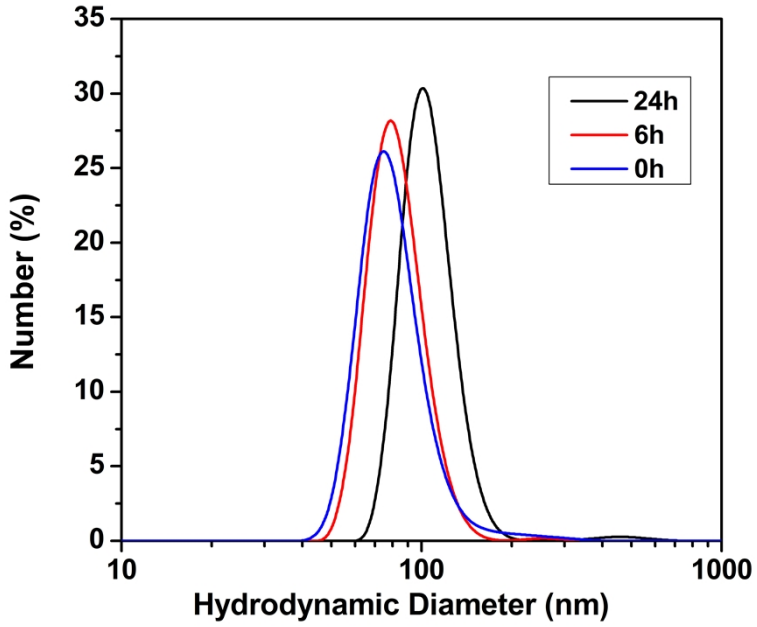


Figure S7. DLS curves of CP1-*dyn*-T in the PBS buffer containing 10 mM GSH at specified intervals (pH 7.4, 37 ˚C).

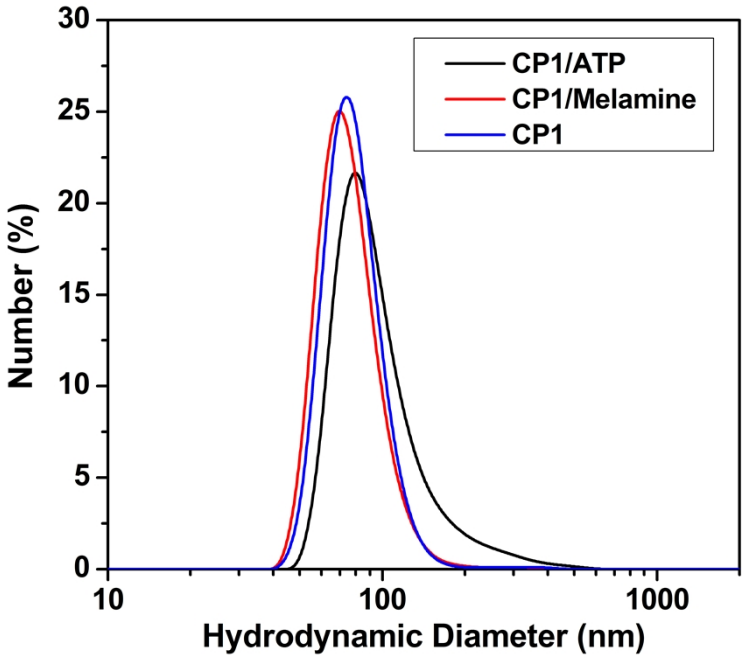


Figure S8. DLS curves of CP1, CP1 with the addition of melamine, and CP1 with the addition of ATP in H_2O.

References.

1. Y. Ura, J. M. Beierle, L. J. Leman, L. E. Orgel, M. R. Ghadiri *Science,* 2009, **325**, 73.
2. A. W. Jackson, D. A. Fulton, *Macromolecules*, 2012, **45,** 2699.
3. C. C. Cheng, C. F. Huang, Y. C. Yen, F. C. Chang, *J. Polym. Sci., Part A: Polym. Chem.,* 2008, **46,** 6416.