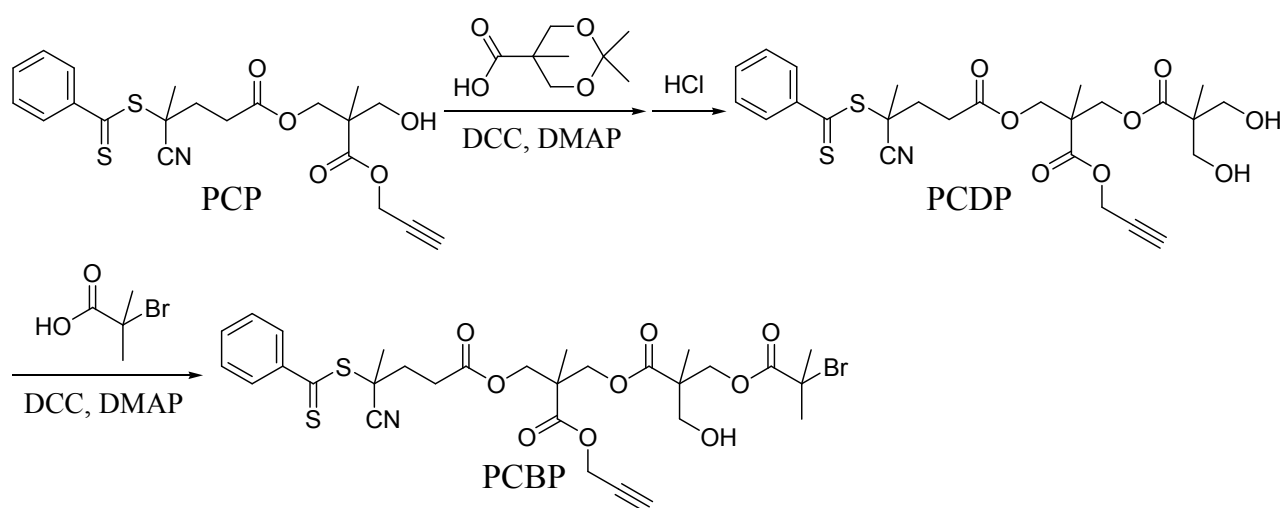


## Supporting Information

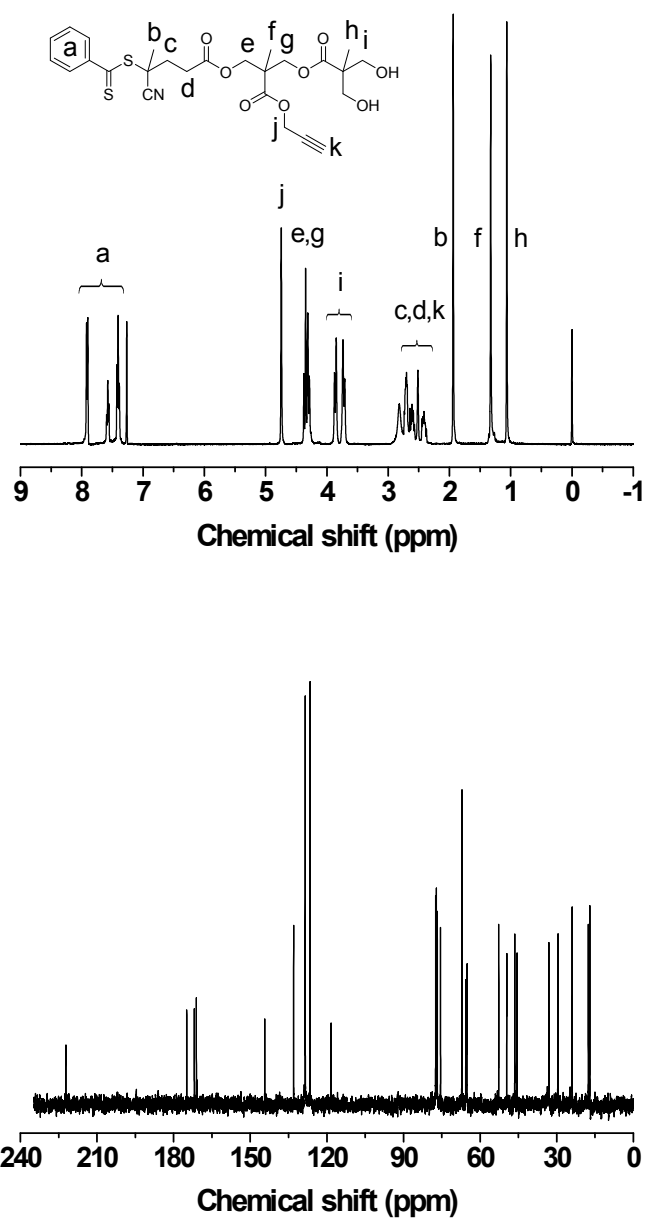
### Synthesis and properties of an acid-labile dual-sensitive ABCD star quaterpolymer

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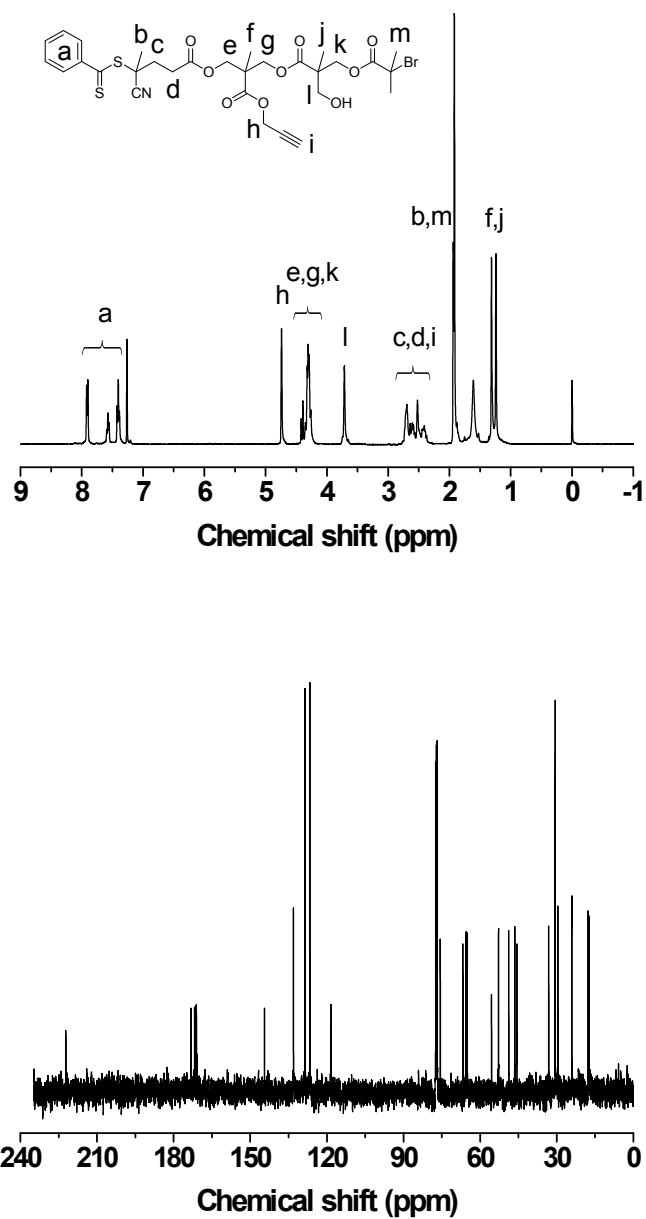
Suzhou Key Laboratory of Macromolecular Design and Precision Synthesis, Jiangsu Key Laboratory of Advanced Functional Polymer Design and Application, State and Local Joint Engineering Laboratory for Novel Functional Polymeric Materials, College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Suzhou 215123, China. Tel: +86-512-65882045; E-mail: ylzhao@suda.edu.cn



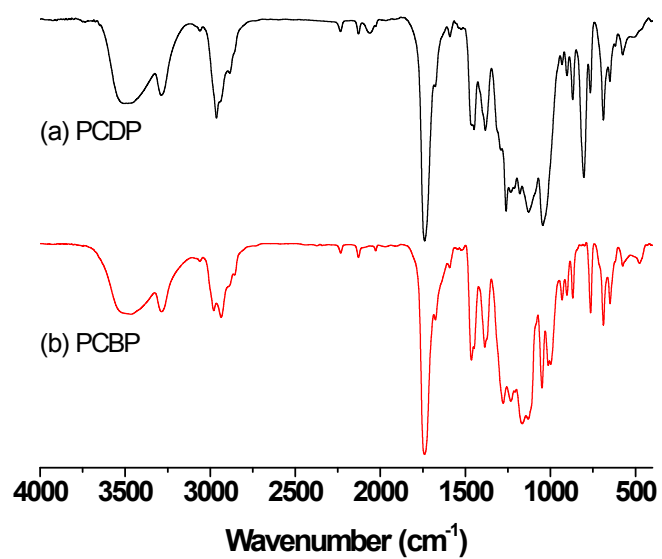
**Scheme S1** Synthetic routes to prop-2-ynyl 3-(5-cyano-5-phenylthiocarbonylsulfanyl)pentanoate 2-(2-bromo-2-methylpropanoate) 2-(2-hydroxyethyl)propanoate (PCBP).



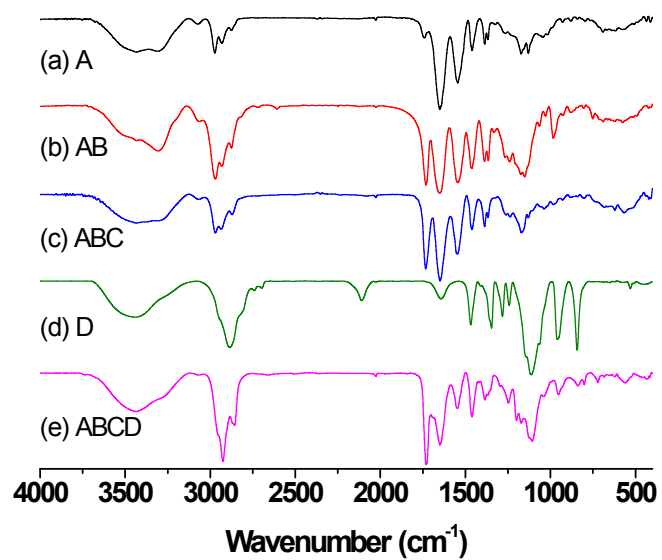
**Fig. S1** <sup>1</sup>H (top) and <sup>13</sup>C (bottom) NMR spectra of prop-2-ynyl 3-(5-cyano-5-phenylthiocarbonyl sulfanyl)pentanoyloxy-2-(2,2-dihydroxymethyl)propionyloxymethyl-2-methylpropanoate (PCDP).



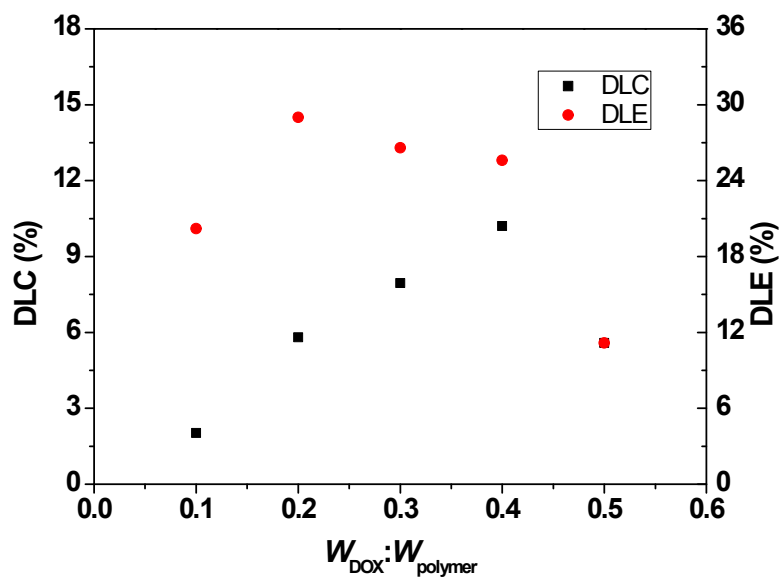
**Fig. S2** <sup>1</sup>H (top) and <sup>13</sup>C (bottom) NMR spectra of prop-2-ynyl 3-(5-cyano-5-phenylthiocarbonyl sulfanyl)pentanoyloxy-2-(2-bromo-2-methylpropanoyloxy)methyl-2-hydroxymethylpropionyloxy methyl-2-methylpropanoate (PCBP).



**Fig. S3** IR spectra of PCDP and PCBP.



**Fig. S4** IR spectra of PNIPAM (A), PNIPAM-*b*-PDPA (AB), PNIPAM-PDPA-PCL star terpolymer (ABC), PEG-*a*-N<sub>3</sub> (D) and PNIPAM-PDPA-PCL-*a*PEG star quaterpolymer (ABCD).



**Fig. S5** Influence of weight ratio of DOX to ABCD star on DLC and DLE of DOX-loaded copolymer aggregates ( $c_{\text{polymer}} = 0.50 \text{ mg mL}^{-1}$ ) obtained at 37 °C.