Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information

Optically active hollow nanoparticles constructed by chirally helical substituted polyacetylene

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Experimental Section

Preparation process of monomer 1 (M1)

(S)-(+)- or (R)-(–)-2-phenylpropionic acid (1.5 g, 10 mmol), isobutyl chloroformate (1.3 mL, 10 mmol) and 4-methylmorpholine (1.1 mL, 10 mmol) were added into tetrahydrofuran (ca. 100 mL) sequentially. The solution was stirred for about 40 min firstly at room temperature and then propargylamine (0.65 mL, 10 mmol) was added in dropwise. The reaction lasted for 4 h and the white precipitate formed during the reaction was filtered off. The filtrate was collected and washed with 2 M HCl aqueous solution three times and then with saturated aqueous $NaHCO_3$ aqueous solution to neutralize the solution. After that, the solution was dried over anhydrous $MgSO_4$, filtered, and then concentrated to give the crude product. The crude product was purified by recrystallization twice from THF-hexane to give the target monomer 1.

Table S1. Elemental analysis of M1 ($C_{12}H_{13}NO$)

	C	H	N
Calculated	76.98	7.00	7.48
Found	76.99	6.96	7.48

Table S2. Data of P1 before treatment (original P1), treated by HF solution (P1-HF), and treated by NaOH (P1-NaOH).

Run[a)]	**M_n**[b)]	**M_w/M_n**[b)]
original P1	6300	1.58
P1-HF (10 wt%, 6 h)	6700	1.49
P1-NaOH (1 M, 10 h)	6900	1.47

a) For detailed operations, refer to Experimental Section;

b) Measured by GPC (poly-styrene as standards, THF as eluent).

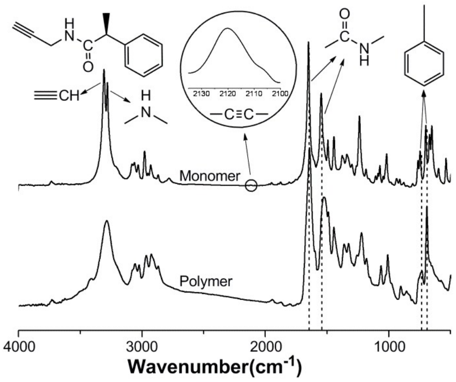

Figure S1. Typical FT-IR spectra of M1 and the polymer P1.

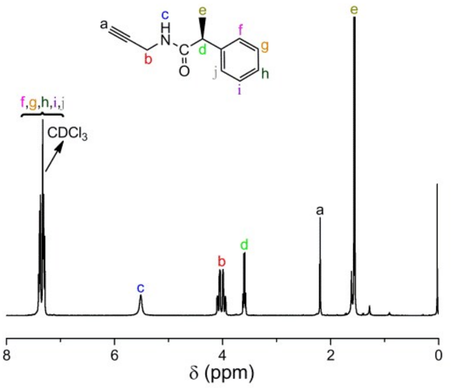

Figure S2. ^{1}H NMR spectra of M1.

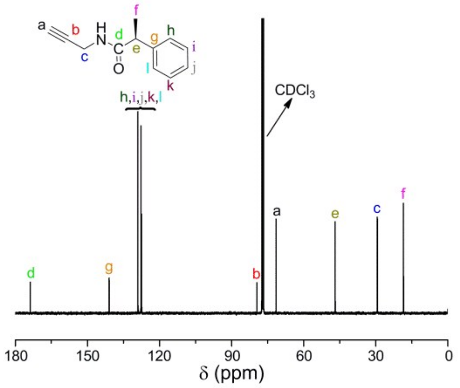

Figure S3. ^{13}C NMR spectra of M1.

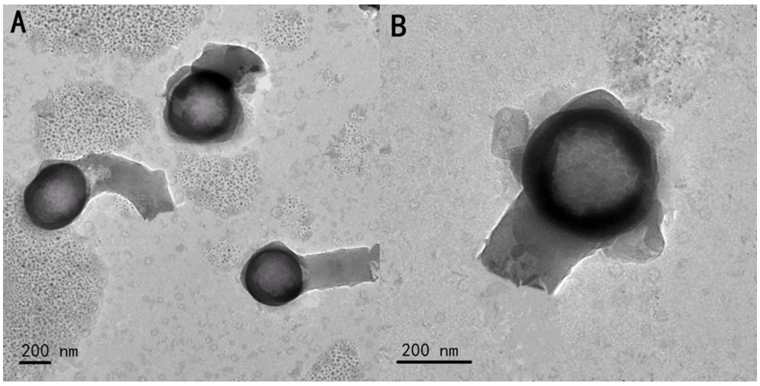

Figure S4. TEM images of P1 hollow NPs (etching the cores by using NaOH solutions, 1 M, 10 h).

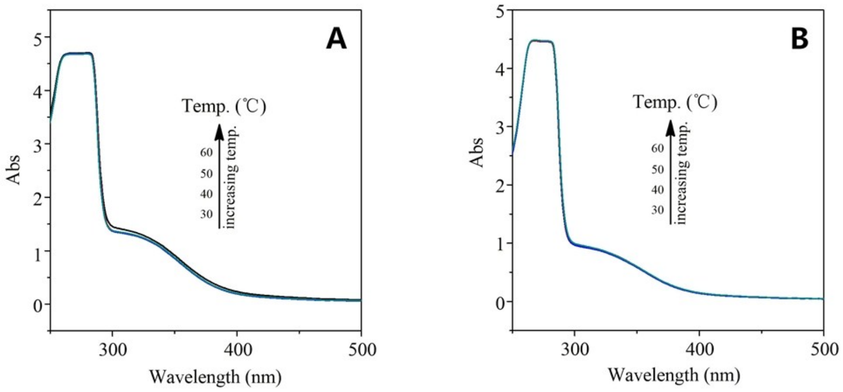

Figure S5. Temperature dependence of UV-vis spectra of P1 hollow NPs: (A) S-P1 hollow NPs and (B) R-P1 hollow NPs.

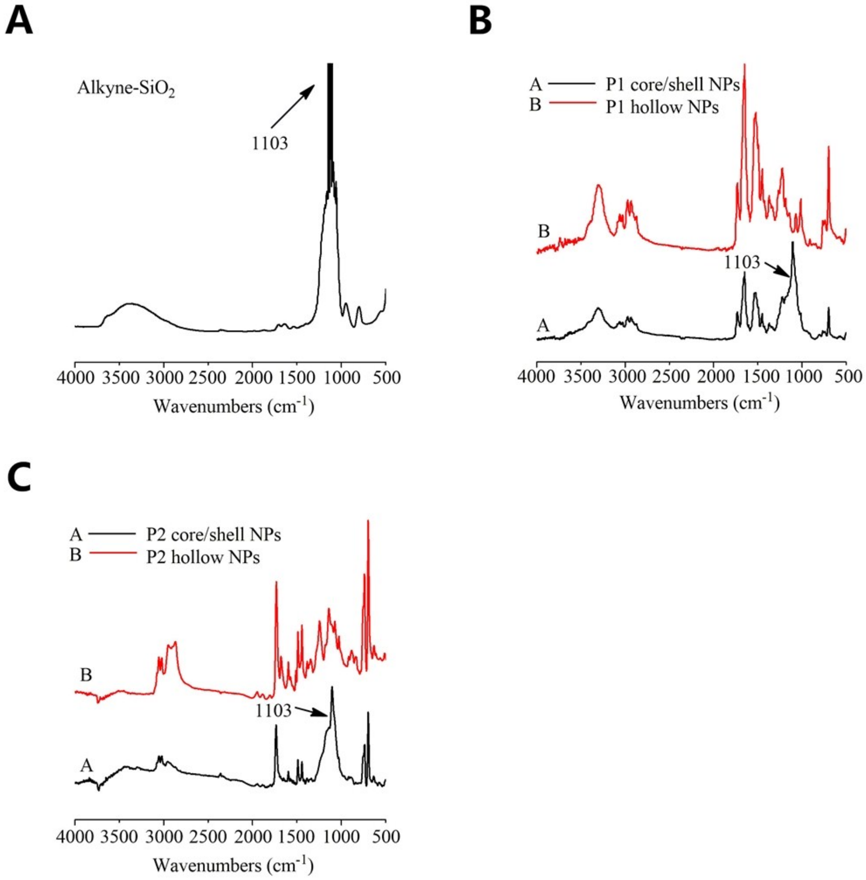

Figure S6. Typical FT-IR spectra of NPs. (A) Alkyne-SiO_2 NPs; (B) SiO_2@P1 core/shell NPs and P1 hollow NPs; (C) SiO_2@P2 core/shell NPs and P2 hollow NPs. The spectra were recorded by using KBr tablet.

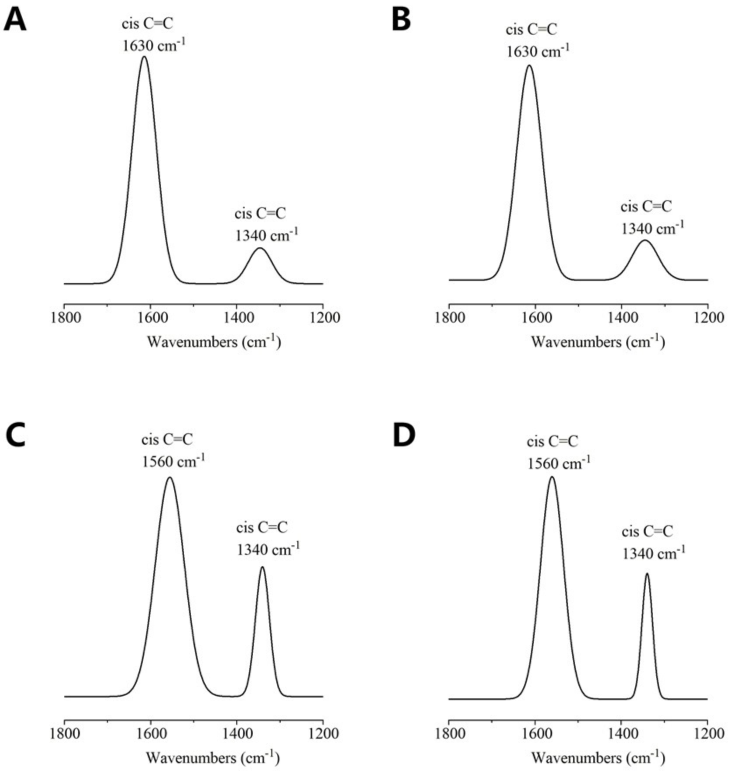

Figure S7. Raman spectra of NPs (measured at r.t.) (A) SiO_2@P1 core/shell NPs; (B) P1 hollow NPs; (C) SiO_2@P2 core/shell NPs and (D) P2 hollow NPs.

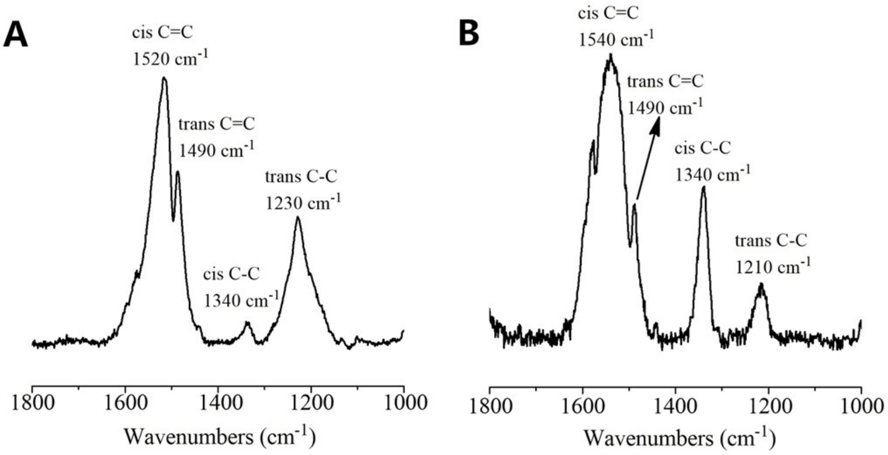

Figure S8. Raman spectra of the polymer derived from M2 (measured at r.t.) with catalysts: (A) WCl_6-Ph_4Sn (polymerization conditions: monomer=0.1 mol/L, catalyst=1.5 mmol/L; Ph_4Sn=1.5 mmol/L, in toluene, 30 ^oC, 3 h. M_n=10800, M_w/M_n=1.77); (B) $MoCl_5$-Ph_4Sn (polymerization conditions: monomer=0.1 mol/L, catalyst=1.5 mmol/L; Ph_4Sn=1.5 mmol/L, in toluene, 30 ^oC, 3 h. M_n=7600, M_w/M_n =1.78).