Electronic Supplementary Information

Topochemical polymerization of dumbbell-shaped diacetylene monomers: relationship between chemical structure, molecular packing structure, and gelation property

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Fig. S2 ¹H NMR spectrum of compound AT₃DI

	Experimental Content (%)	Calculated Content (%)
	77.38	
С	77.41	77.62
	77.55	
	10.67	
Н	10.69	10.75
	10.71	
N	2.951	
	2.988	3.02
	2.993	

Fig. S3 EA of compound AT₃DI.







Fig. S5 ¹H NMR spectrum of compound BP₃DI.

	Experimental Content (%)	Calculated Content (%)
	72.96	
С	73.48	73.75
	73.69	
н	7.85	
	7.97	8.19
	8.12	
N	1.53	
	1.58	1.69
	1.61	

Fig. S	6 EA of	compound	BP ₃ DI.
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Fig. S9. 1D WAXD and POM of AT_3DI at 150 °C.



Fig. S10 POM of BP_3DI at different phase.



Fig. S11 2D WAXD of uniaxially oriented BP₃DI in the K₂ phase.



Fig. S12 2D WAXD of uniaxially oriented BP₃DI in the LC phase.



Fig. S13 1D WAXD of AT₃DI after photopolymerization at room temperature.

Solvent ^a	AT ₃ DI	BP ₃ DI
Tetrahydrofuran	Sb	S
Hexane	c	I
Cyclohexane	Gd	I
Chloroform	G	S
Toluene	G	Р
Ethyl acetate	Pe	Р
Acetone	Р	Р

Fig. S14 Gelation ability of AT₃DI and BP₃DI in various organic solvents. ^aconcentration of diacetylene monomer = 0.5 wt%; ^bS = soluble; ^cI = insoluble; ^dG = gel; ^eP = precipitate.



Fig. S15 SEM of freeze-dried AT₃DI gel before and after photopolymerization.



Fig. S16 Macroscopic images of sol state of 0.5 wt% AT_3DI in toluene at 70 °C.