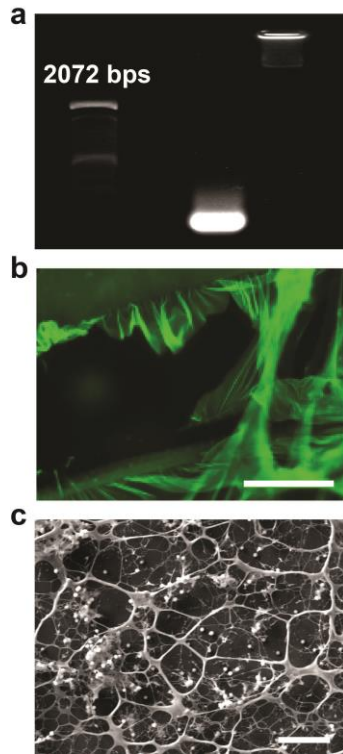
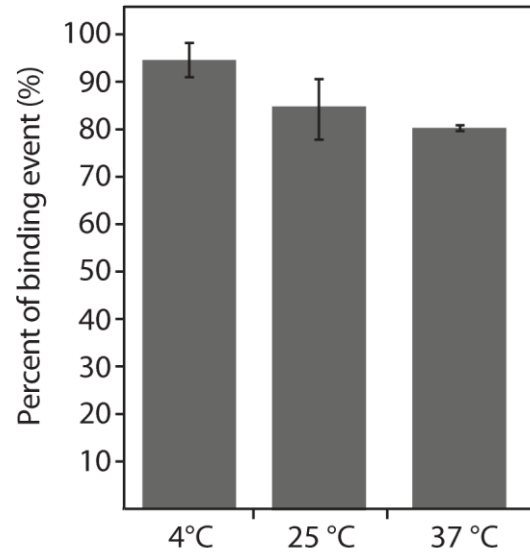


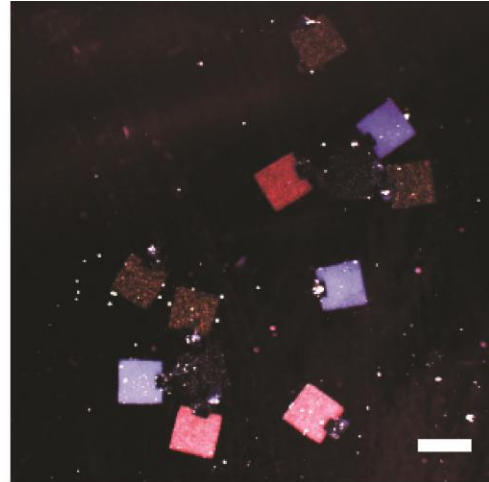
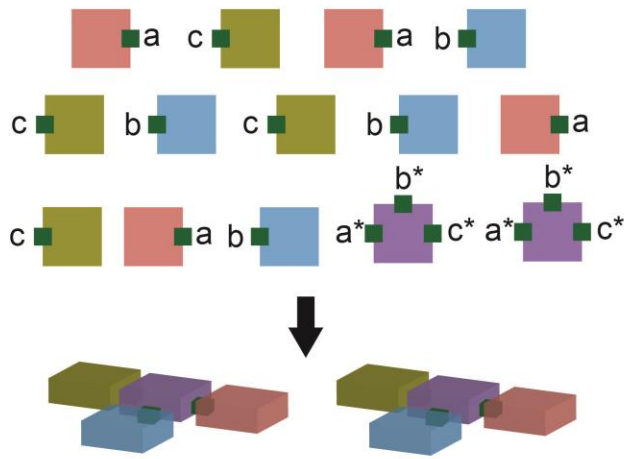
Supplementary figure S1 | DNA directed self-assembly of hydrogel units.



Supplementary figure S2 | **a**, Single-stranded 84-nt DNA primer before amplification (middle lane) and post-amplification giant DNA (right lane) on 1% agarose gel, stained with SYBR Gold. Left lane, 100 bp DNA ladder with the 2072 bp fragment labeled. **b**, Giant DNA amplified from an 84-nt primer tethered on PEG surface. The giant DNA was stained by SYBR gold. Scale bar, 1 mm. **c**, SEM image of amplified giant DNA on glass surface. Scale bar, 50 μ m.



Supplementary figure S3 | Quantification of giant DNA glue directed assembly between gel cubes under different temperatures. Assembly quantification under different temperatures were performed by assembling only two hydrogel cubes uniformly carrying complementary giant DNA glue in one microtube at 4°C, 25°C and 37°C respectively. Six independent experiments, each including 10 microtube samples, were performed at each temperature respectively and analyzed using STDEV function for standard deviation by software Excel (MicrosoftTM).



Supplementary figure S4 | Two copies of T-junctions structures were self-assembled from four specific red, blue, yellow, and violet $1 \text{ mm} \times 1 \text{ mm} \times 0.3 \text{ mm}$ PEG cuboids carrying patterned giant DNA glues. In the schematic, the parts that contain DNA are colored green and labeled with letters, where x and x^* denote two complementary DNA glues. See Supplementary Table S1 for DNA sequences. Scale bar, 1 mm.

Supplementary Table S1: DNA sequence

Name	Sequence (5'-3')
a	CTCTACTACCTTCTCCCTCCCACAAACGCAAACCCACTACCACCAAAC
a*	GTTTGGTGGTAGTGGGTTTGC GTTTGTGGGAGGGAGAAGGTAGTAGAG
b	TCAATGTAAGTGCAGATAAAGTACTCGCGCACTACTATGTTTTAGCTA
b*	TAGCTAAAACATAGTAGTGC GCGAGTACTTTATCTGCACTTACATTGA
c	GACTATATCGTATCGACTCATCCATGATAGTAATCAATTCAGGCCATC
c*	GATGGCCTGAATTGATTACTATCATGGATGAGTCGATACGATATAGTC
Primer a	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTGGAGGGAGAAGGTAGTAGAG
Primer a*	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTCTCTACTACCTTCTCCCTCC
Primer b	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTGC GCGAGTACTTTATCTGC
Primer b*	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTGC GCACTACTATGTTTTAGC
Primer c	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTACTATCATGGATGAGTCG
Primer c*	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTATCGACTCATCCATGATAG
PolyT	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT
D001	aaaaaactaacatttaactaata
D001S	tattagtaaagttagttttt
D002	aaaaacttattatcaaatfactat
D002S	atagtaattgataataagtttt
D003	attacataattcaattttcata
D003S	tatgaaaaattgaattatgtaaat
D004	aaattacattactaaactfata
D004S	tataaagtttaagtaatgtaatt
D005	attattctaaattctaaaacaata
D005S	tattgttttagaatttagaataat
D006	aaatatactatatactaaactaaa
D006S	tttagtttagtatatagtatatt
D007	ttatcattatacaattactftaa

D007S	ttaaagtaaattgataatgataa
D008	taaattcttttcattatcataaa
D008S	tttatgataatgaaaaagaattta
D009	aaaaacaataactataactataaat
D009S	atftatagtatagtatttgtttt
D010	aatacttatcaatacatataaat
D010S	atftatatgtatttgataagtatt
D011	ttattcaaaaactattcttaa
D011S	ttaagaatagtattttgaataa
D012	taaattcatatatcttacaataaa
D012S	tttattgtaagatatgaattta
D013	aaaattactttatacaaacattta
D013S	taaagtgttgataaagtaattt
D014	ttatcttaatattcatttcaaaa
D014S	tttagaatgaatattaagataa
D015	aatataatcataacatttctata
D015S	tataagaaatggtatgattatatt
D016	taactaaaaacataacttaattt
D016S	aaattaagtatatgttttagtta
D017	tttaatcaaaatctaaacatta
D017S	taatgtttagatatttgattaaa
D018	ttctattacaaaaatcaataaaa
D018S	tttattgatttttgaatagaa
D019	aaatttcataacttaacatattt
D019S	aaatatgttaaagttatgaattt
D020	aatctaataacaaatttctatata
D020S	tatatagaatttgttattagatt
D021	atftcaattcattaataacttaa

D021S	ttaagttattaatgaattgaaat
D022	atatacattataactaattcaaaat
D022S	atgttggaattagataatgtatat
D023	aataactaatatcttaaaactatat
D023S	atataagttttaagatattagtatt
D024	ataaatcatatctattctaattaa
D024S	ttaattagaatagatatgatttat
D025	atataactaattctataatacaata
D025S	tattgtattatagaattagtatat