Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information

Inspired by elastomers: Fabrication of hydrogels with tunable properties and re-shaping ability via photo-crosslinking at macromolecular level

Changxu Zhang,[a] Zhiyong Liu,[a] Zixing Shi,*[a] Tiantian Li,[a] Hongjie Xu,[a] Xiaodong Ma,[a] Jie Yin,[a] and Ming Tian*[b]

[a]School of Chemistry & Chemical Engineering, State Key Laboratory of Metal Matrix Composite Materials and Shanghai Key Lab of Electrical Insulation and Thermal Ageing, Shanghai Jiao Tong University, 800 Dongchuan Road, Shanghai, 200240, China.

[b]State Key Lab of Organic–Inorganic Composites, Beijing University of Chemical Technology, Beijing, 100029, China.

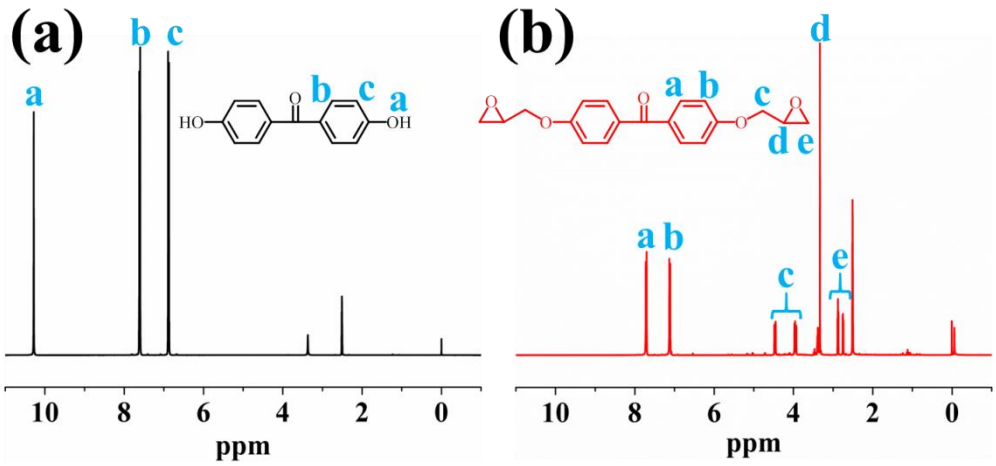

Fig. S1 ^{1}H NMR spectra of (a) DHBP and (b) DEBP

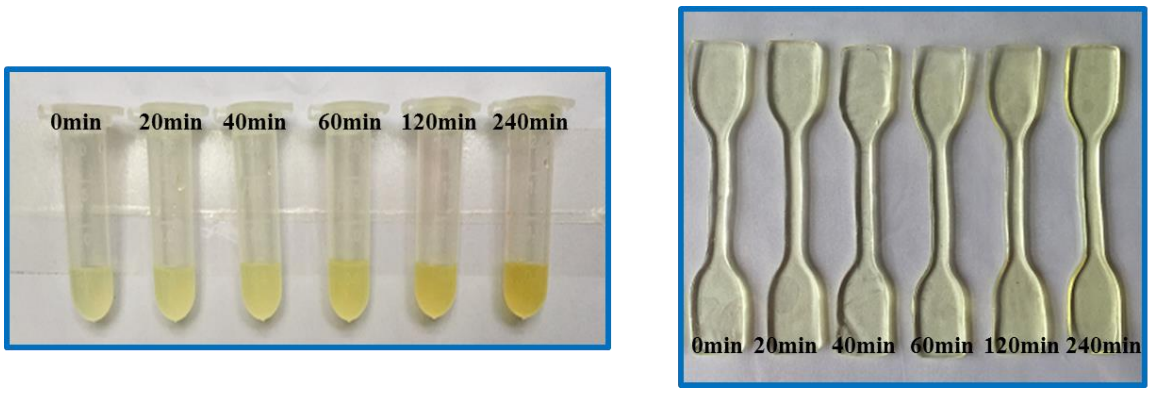

Fig. S2 Photographs of model compounds (left) and PEA5%-PAAm hydrogels (right) under different UV irradiation time

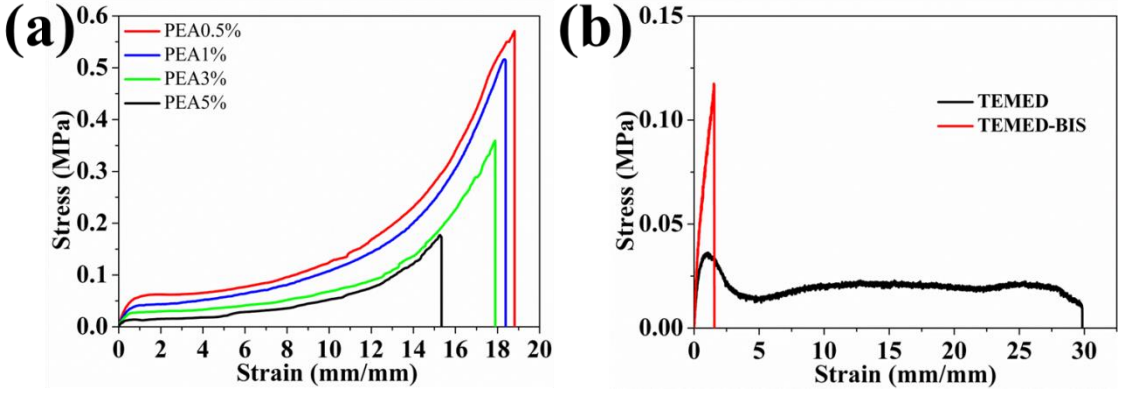

Fig. S3 Tensile stress–strain curves of (a) PEA-PAAm hydrogels with different content of PEA before UV irradiation, (b) TEMED hydrogels and TEMED-BIS hydrogels.

Table S1. Compositions of hydrogels including the conventional chemically cross-linked TEMED-BIS hydrogels using organic BIS as cross-linker and PEA-PAAm hydrogels with PEA as the cross-linker.

Sample	AAm/g	PEA/g	APS/g	TEMED/g	MBA/g	Water content
PEA0.5%	10	0.05	0.01	0	0	70%
PEA1%	10	0.1	0.01	0	0	70%
PEA3%	10	0.3	0.01	0	0	70%
PE5%	10	0.5	0.01	0	0	70%
TEMED	10	0	0.01	0.053	0	70%
TEMED-BIS	10	0	0.01	0.053	0.05	70%

Table S2. The formulas of the model compounds.

Sample	AAm/g	PEA/g	APS/g	Water/g
PEA-APS-0.5%	0.5	0.5	0.0025	10
PEA-APS-1%	0.5	0.5	0.005	10

Table S3. Mechanical properties (Elongation at break, Tensile modulus and tensile strength) comparison of PEA-PAAm hydrogels with varied contents of PEA before and after UV irradiation 120 min.

Hydrogels	UV irradiation time (min)	Elongation at break (mm/mm)	Tensile modulus (kPa)	Tensile strength at break (kPa)
PEA0.5%-PAAm	0	18.81	107	577
	120	14.92	115	590
PEA1%-PAAm	0	18.38	83	521
	120	13.64	98	623
PEA3%-PAAm	0	17.89	52	359
	120	12.49	72	552
PEA5%-PAAm	0	15.34	42	171
	120	12.00	75	500