Supporting Information for

A novel stimuli-responsive fluorescent elastomer based on AIE mechanism

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Experimental Section

Synthesis of TPE-2CH_2Br

The reaction was carried out under a nitrogen atmosphere. Briefly, cross McMurry coupling reaction of dimethyl benzophenone catalyzed by $TiCl_4$-Zn in THF was lasted for 12h to obtain dimethyl tetraphenylethylene (TPE-2CH_3). The precipitate was filtered off and the filtrate was evaporated to dryness in vacuo. The residue was then dissolved in dichloromethane, and the solution was washed by

distilled water twice. The collected organic layer was dried by sodium sulfate, and the solvent was removed in vacuo. Purification by silica gel column chromatography (eluent, hexane) afforded TPE-2CH_3 as a white powder. ^{1}H NMR (Bruker ARX 400 NMR spectrometers, $CDCl_3$) δ (ppm) 7.20-6.93(m,18H), 2.22(s,6H). Then TPE-2CH_3 together with N-bromosuccinimide (NBS) were dissolved in CCl_4 at mol rate of 1:1.2, after that, BPO was added into the solution at weight ratio of 5%, the blends were stirred and refluxed overnight. The precipitate was filtered off, and the filtrate was evaporated to dryness in vacuo. Purification by silica gel column chromatography (eluent, hexane: chloroform=9:1,v/v) afforded TPE-2CH_2Br as a white yellow powder. ^{1}H NMR (400MHz, $CDCl_3$), δ(ppm) 7.17-7.12(m, 10H), 7.05-6.99(m, 8H), 4.45(s, 2H), 4.43(s, 2H).

Preparation of TPE-PDMS oligomer

At first, a certain amount of Aminopropyltriethoxysilane(APTES) was blended with PDMS at room temperature, then DBTDL (0.1%wt) was drop into the blends. After being heated at 60℃ with continuous stirring for 6h, the modified PDMS was obtained. Then the modified PDMS was dissolved in THF solution with a certain amount of TPE-2CH_2Br, the reactants refluxed overnight. After being cooled to room temperature, the product was pour into a certain amount of petroleum ether solvent, the precipitate was filtered off and the dried in vacuo. Then the product was dissolved in THF again, precipitated with petroleum ether solvent and dried in vacuo for three times. After that, the final TPE-PDMS oligomer was obtained.

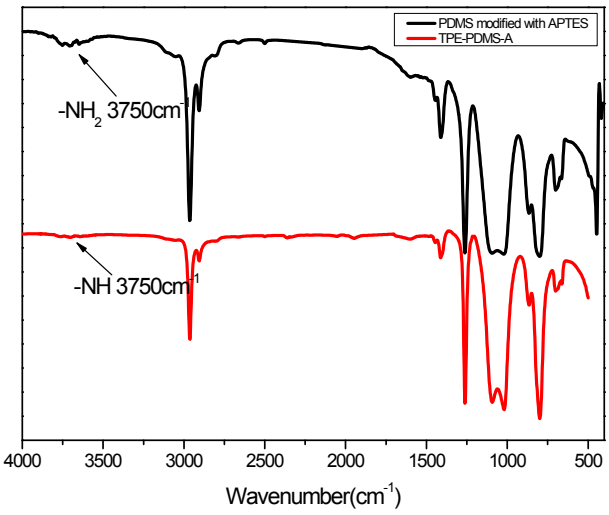

Fig.1S FTIR spectra of PDMS modified with APTMS and TPE-PDMS-A

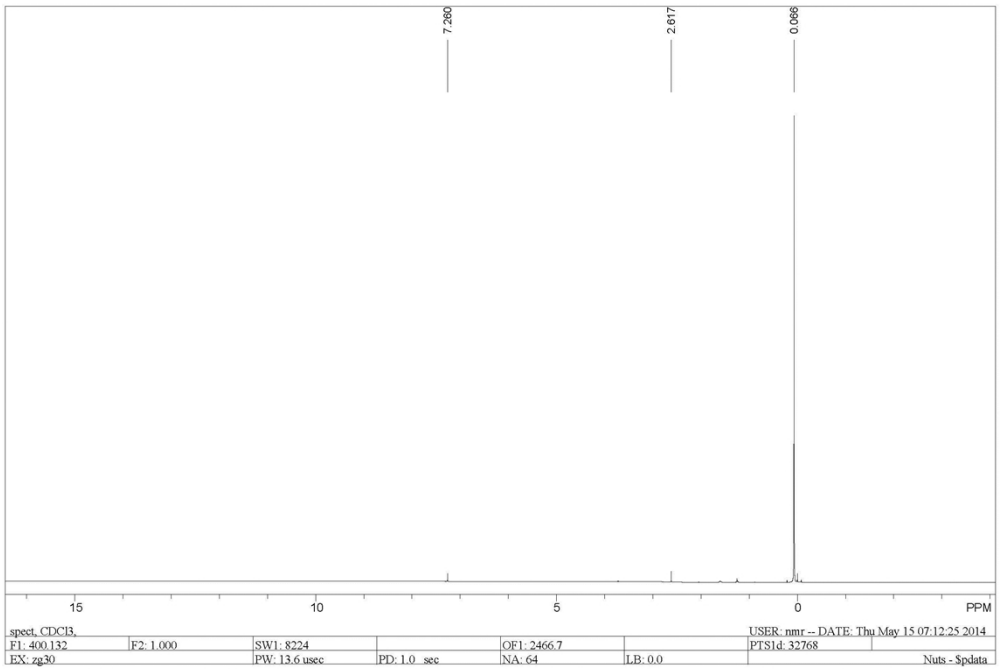

Fig.2S ^{1}HNMR of TPE-PDMS-A

Table 1S. Effect of the content of siliane coupling agent on the polymerization of TPE-PDMS oligomer

Sample	M_n	M_w	M_w/ M_n
TPE-PDMS-A	209000	299800	1.43
TPE-PDMS-B	182400	262800	1.44
TPE-PDMS-C	143500	190900	1.33
TPE-PDMS-D	123700	160800	1.30
TPE-PDMS-E	120000	151400	1.26

Table 2S. Thermal Transition properties of the elastomers obtained by DSC measurement

Sample	T_m	ΔH_m
STP-A	-45.91℃	25.9J/g
STP-B	-44.94℃	25.28J/g
STP-C	-46.12℃	25.18J/g
STP-D	-46.62℃	21.26J/g
STP-E	-45.93℃	20.45 J/g
pure PDMS-based elastomer	-50.09℃	18.46J/g

Table 3S. Mechanical properties of the different elastomers

Sample	Elongation at break (%)	Tensile modulus	Tensile Strength(MPa)
STP-A	406.898	0.878	2.493

STP-B	250.893	0.584	1.524
STP-C	250.835	0.579	1.342
STP-D	244.7814	0.561	1.244
STP-E	200.058	0.524	0.772
PDMS-TEOS	251.753	0.479	0.457