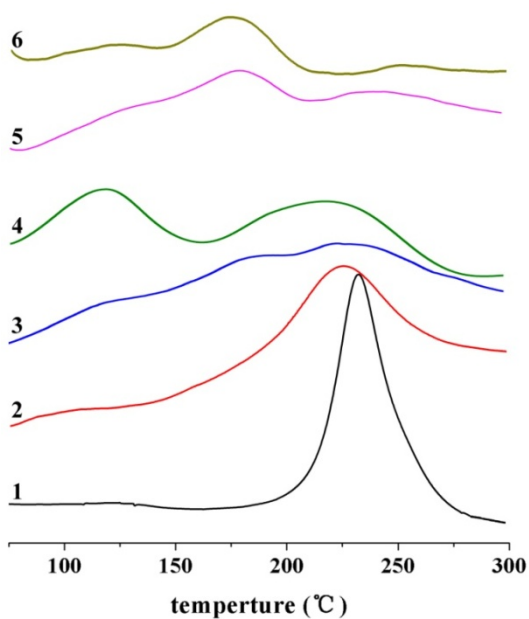Supporting Information

Fig.SI 1. DSC curves of the reactive BA-a/A1 mixtures of a variety of molar ratios: (1) without A1, (2) 1:0.25, (3) 1:0.5, (4) 1:1, (5) 1:2, and (6) 1:4.
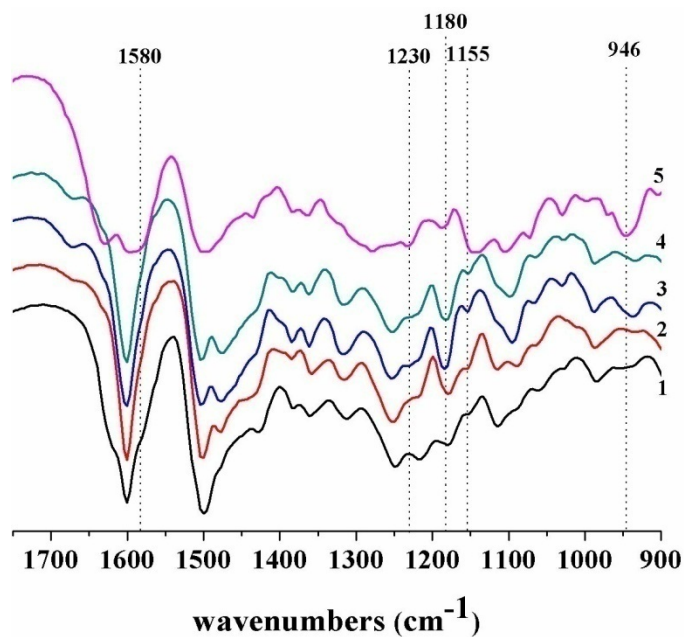

Fig.SI 2. FTIR spectra of the reactive BA-a mixtures with amines (1) A1, (2) A2, (3) A3, (4) A4, and (5) A5, heated at 100 °C for 60 minutes.
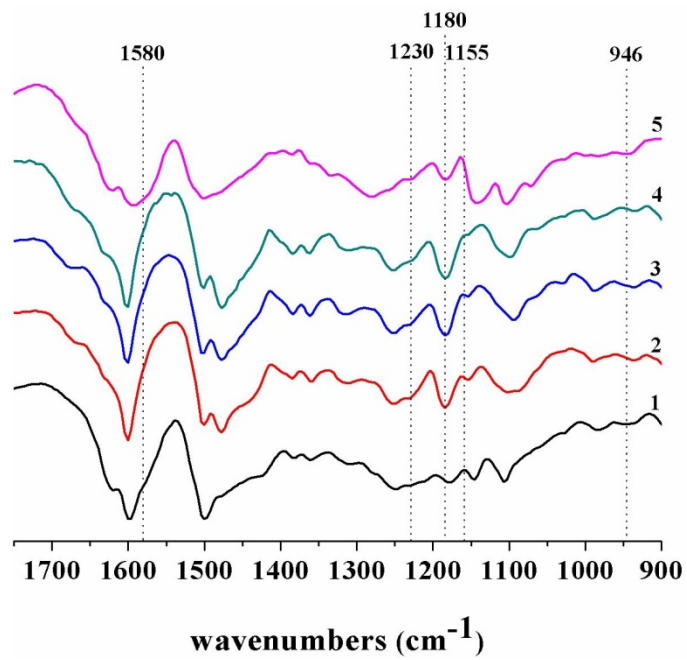
Fig.SI 3. FTIR spectra of the reactive BA-a mixtures with amines (1) A1, (2) A2, (3) A3, (4) A4, and (5) A5, heated at 120 °C and 150 °C for 2 h, respectively.
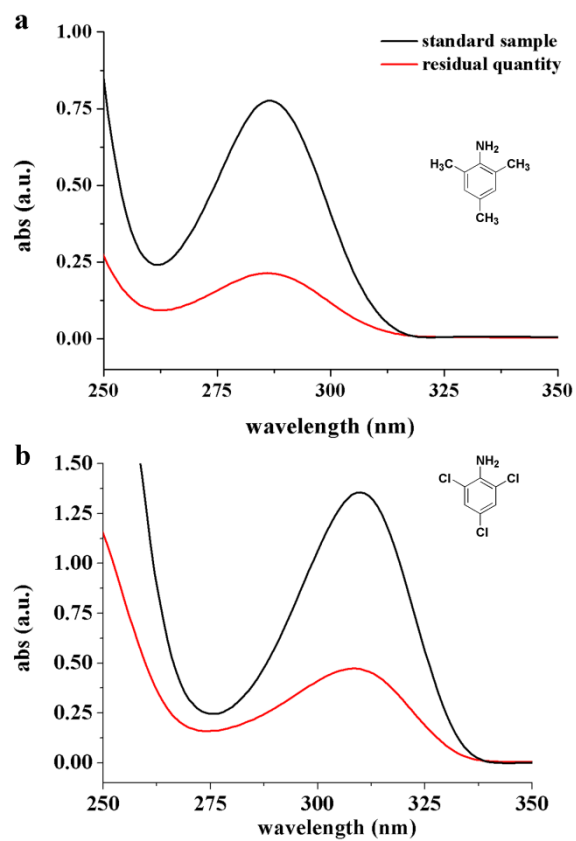
Fig.SI 4. UV−vis absorption spectra of the residual quantity of amines. (a) 2,4,6-Trimethylaniline, and (b) 2,4,6-Trichloroaniline. (the residual amines in the completely amine cured benzoxazine resins were extracted with methanol in a Soxhlet extractor.)

TableSI 1 Relative viscosity and reaction activity of benzoxazine/amine curing systems at different temperatures

Curing system	120 °C		150 °C	
	Gel time (min)	Reaction activity (min^{-1})	Gel time (min)	Reaction activity (min^{-1})
pure BA-a	364	2.75×10^{-3}	189	5.29×10^{-3}
BA-a/A1	11	9.09×10^{-2}	3	3.33×10^{-2}
BA-a/A2	36	2.78×10^{-2}	10	1.00×10^{-2}
BA-a/A3	63	1.59×10^{-2}	15	6.67×10^{-2}
BA-a/A4	33	3.03×10^{-2}	12	8.33×10^{-2}
BA-a/A5	81	1.23×10^{-2}	33	3.03×10^{-2}

TableSI 2 Thermal properties of benzoxazine /amine curing systems.

Curing system	$T_{5\%}$(°C)[a]	$T_{10\%}$(°C)[b]	T_{max}(°C)[c]	Y_c(%)[d]
pure BA-a	293	331	394	35
BA-a/A1	278	335	377	43
BA-a/A2	272	289	412	38
BA-a/A3	251	266	407	19
BA-a/A4	267	281	409	20
BA-a/A5	318	351	438	35

[a] $T_{5\%}$: The temperature for which the weight loss is 5%;

[b] $T_{10\%}$: The temperature for which the weight loss is 10%;

[c] T_{ma}: Thetemperature for maximum weight loss; [d] Y_c: Char yields at 800 °C under nitrogen atmosphere.

Table SI 3. The values of T_g, E' and ρ of benzoxazine /amine curing systems.

Sample	Tg (°C)	E' (MPa)		ρ(mol•m^{-3})^a
		50 °C	Tg+ 50	
pure BF-a	185	5182	1269	0.100
BF-a/A1	160	4914	1735	0.144
BF-a/A2	86	5400	1289	0.126
BF-a/A3	105	4749	1081	0.101
BF-a/A4	90	4066	1605	0.156
BF-a/A5	169	2759	385	0.031

[a] crosslinking density was calculated by the modified Nealsen equation (modification of the Flory's rubber elasticity theory).