Table 3.1. *Carbonyl group curve-fitting results of the (a) linear PtBA and (b) four-arm PtBA/ PBZZ blends.*

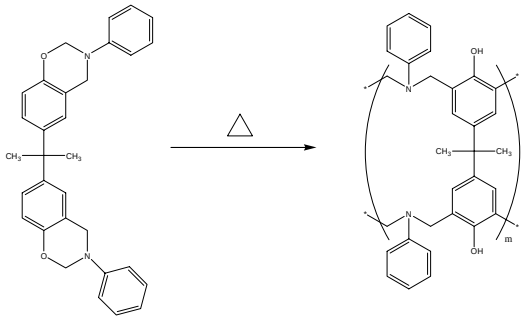
Samples(wt%)	Free C=O		H-bonded C=O		fb[a](%)
	ν_f(cm^{-1})	A_f(%)	ν_b(cm^{-1})	A_b(%)	
(a)PtBA / PBZZ					
90 /10	1728.1	87.77	1705.1	12.23	8.5
70 /30	1728.2	79.79	1705.3	20.21	14.4
50 /50	1727.2	78.14	1705.9	21.86	15.7
30 /70	1728.3	80.17	1705.2	19.83	14.2
10 /90	1727.1	94.60	1705.2	5.40	3.6
(b)Four-arm PtBA/PBZZ					
90 /10	1731.1	78.36	1704.9	21.74	15.6
70 /30	1731.3	75.45	1705.3	24.55	17.8
50 /50	1731.2	70.32	1705.2	29.68	21.9
30 /70	1731.5	76.01	1705.7	23.99	17.4
10 /90	1731.6	88.63	1705.1	11.37	7.8

ν_f : wavenumber of free C=O of PtBA； ν_b : wavenumber of hydrogen bonded carbonyl of PtBA； A_f : fress C=O area fraction of PtBA； A_b : C=O area fraction of hydrogen bonded PtBA. fb[a] : fraction of hydrogen bonded PtBA=$(A_b/1.5)/(A_b/1.5+A_f)$.

Table 3.2. *Relaxation times, $T_{1\rho}^H$, for (a) linear PtBA and (b) four-arm PtBA/PBZZ blends at the magnetization intensities of 127 ppm.*

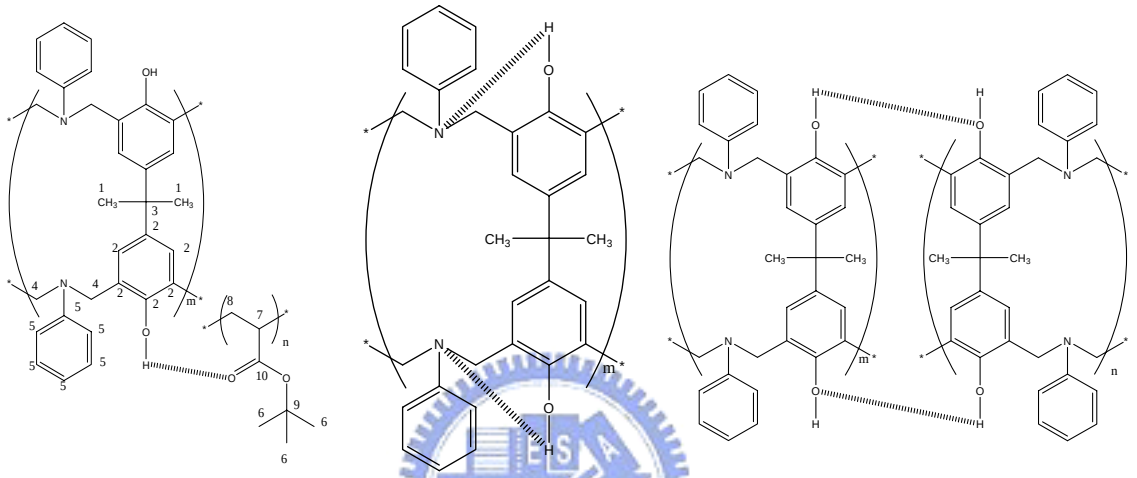
Samples(wt%)	$T_{1\rho}^H$ (ms)	
(a)Linear PtBA / PBZZ		
90 /10	12.54 (80%)	7.74 (15%)
70 /30	11.59 (70%)	10.56 (70%)
50 /50	10.56 (70%)	9.12(25%)
30 /70	10.36 (75%)	8.16(20%)
10 /90	6.85 (75%)	
(b)Four-arm PtBA/PBZZ		
90 /10	10.72 (86.6%)	
70 /30	10.97 (53.3%)	9.25 (26%)
50 /50	9.98 (90.1%)	
30 /70	9.94 (50.1%)	
10 /90	5.93 (33.3%)	11.88 (66%)

Pure PBZZ: $T_{1\rho}^H$ = 7.53 ms.



benzoxazine (BZZ) (B-a type) PBZZ (B-a type)

Scheme 3.1. *The thermal curing of benzoxazines (BZZ).*



(a) (b) (c)

Scheme 3.2. *The schematic representation of hydrogen bonding. (a) inter-association of PtBA/PBZZ blends, (b)intra-association of the pure PBZZ, and (c) inter-association of the pure PBZZ.*

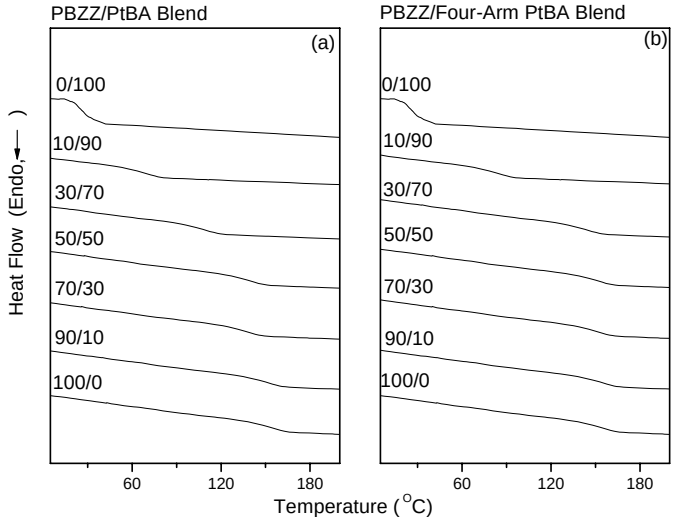


Figure 3.1. *The DSC curves of the (a) linear and (b) four-arm PtBA/PBZZ with different compositions (weight ratio).*

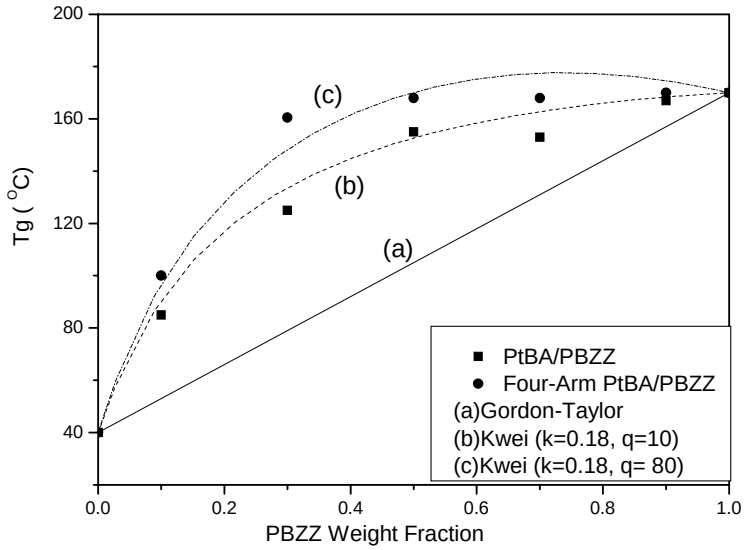


Figure 3.2. *The T_g vs. composition curves based on (a) the Gordon-Taylor equation, (b) the Kwei equation for linear PtBA/PBZZ, (c) the Kwei equation for four-arm PtBA/PBZZ, (■) experimental date of the linear PtBA/PBZZ, and (●) experimental date of the four-arm PtBA/PBZZ.*

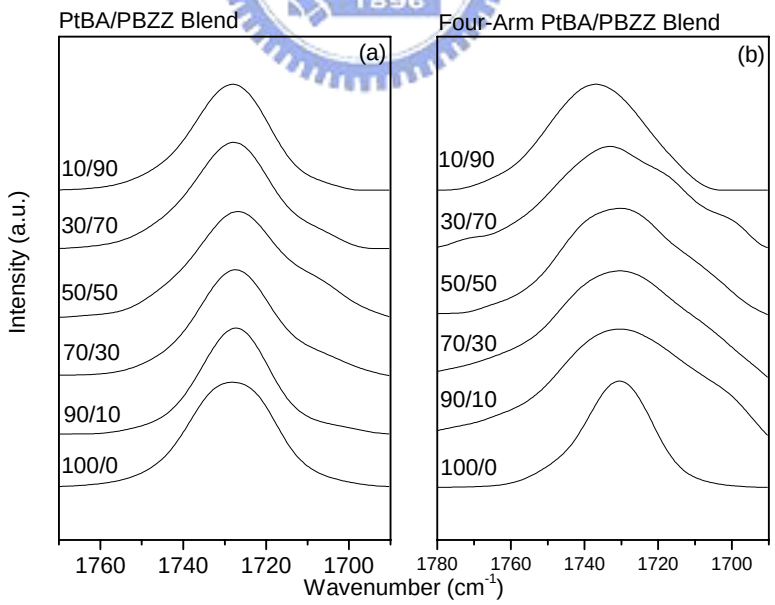


Figure 3.3. *FTIR spectra at room temperature in the 1690-1780 cm^{-1} region for (a) linear and (b) four-arm PtBA/PBZZ with different compositions (weight ratio).*

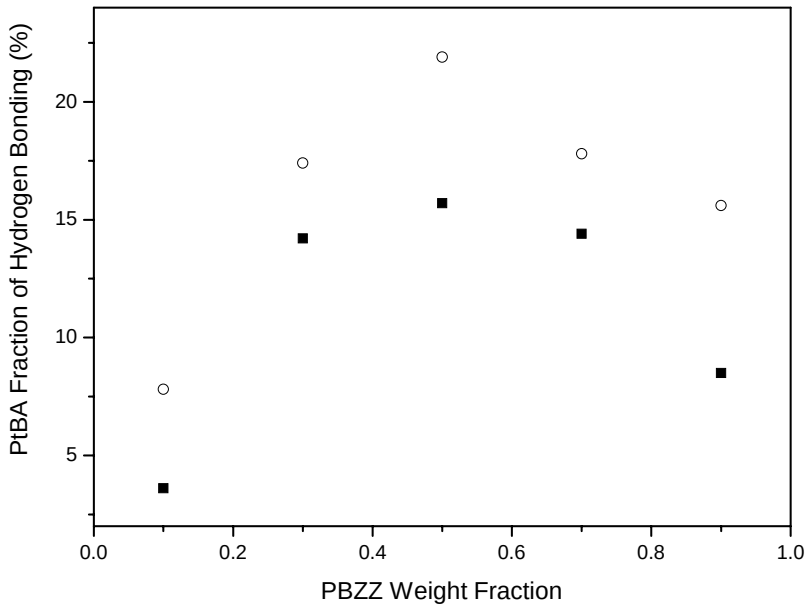


Figure 3.4. *The fraction of hydrogen bonded carbonyl vs. PBZZ content for (a) linear PtBA/PBZZ (■), and (b) four-arm PtBA/PBZZ (○), from FTIR spectra.*

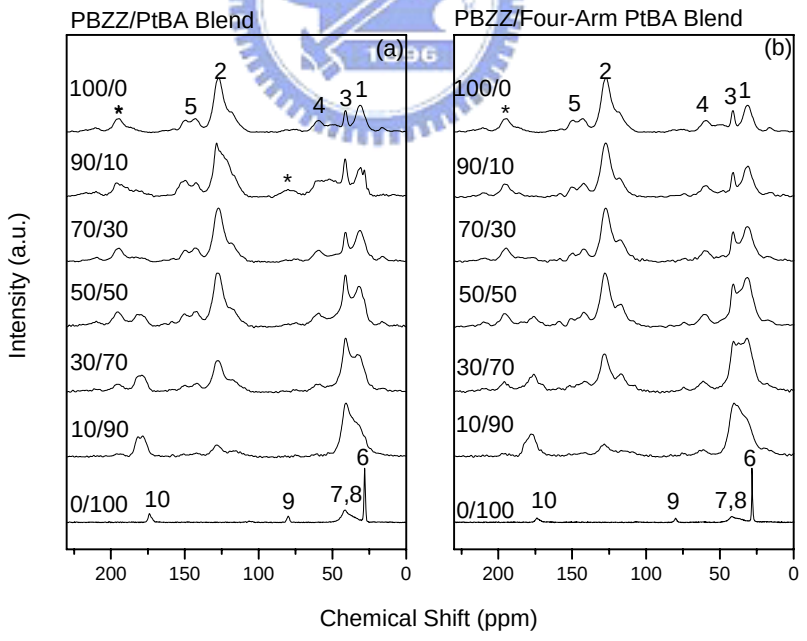


Figure 3.5. *^{13}C CP/MAS NMR for (a) linear and (b) four-arm PtBA/PBZZ with different compositions (weight ratio).*

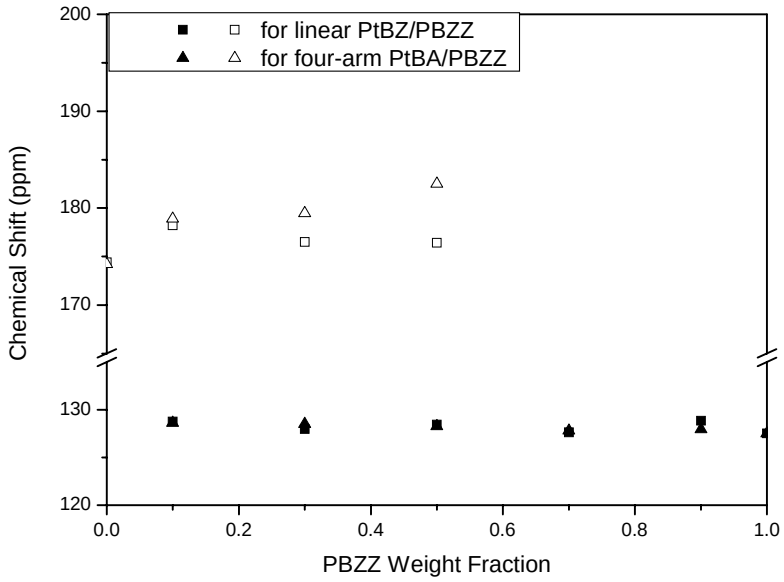


Figure 3.6. *^{13}C CP/MAS NMR Chemical shift of 174 and 127 ppm of blends with different compositions (weight ratio).*

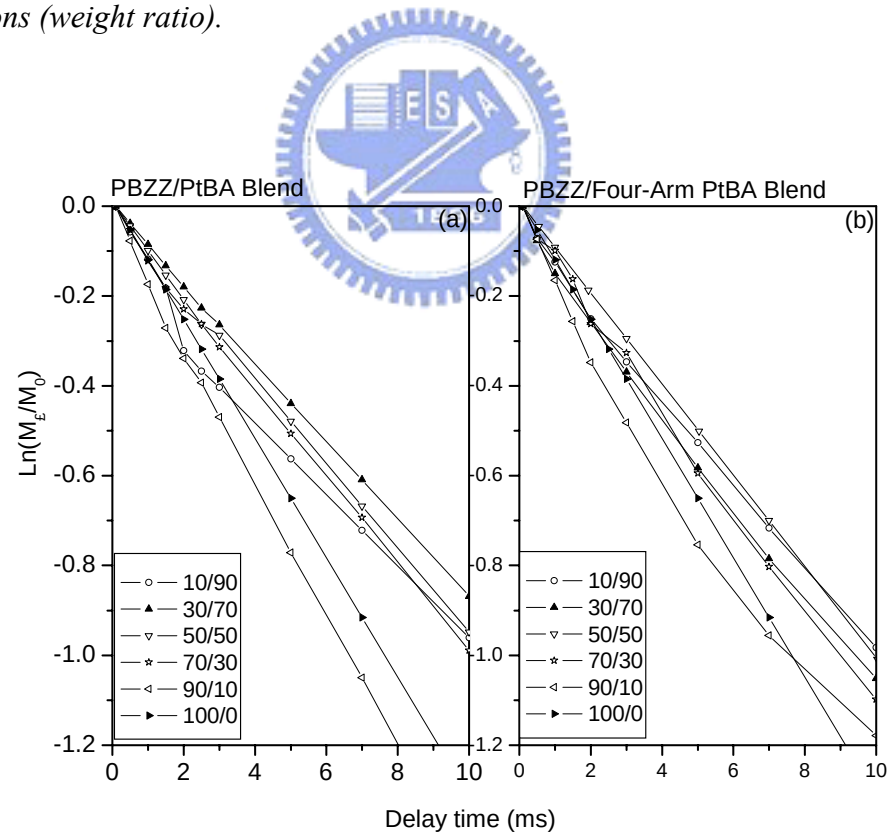


Figure 3.7. *Logarithmic plots of the intensities of 127 ppm vs. delay time for (a) linear and (b) four-arm PtBA/PBZZ with different compositions (weight ratio).*

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