



a) 300 - 1300 가 ; b) 2 50 %가 ; c)  
가 ; d) ; e) 가

1

가

US - A - 3,558,564

US - A - 4,131,571 US - A - 4,555,535

가

(chipping)

(tough)

가  
가

가

가

( , )

가 : US - A - 4,254,168.

가

US - A - 3,875,090

가

U - S - A - 3,691,258

1,2-

가

가

가

US - A - 4,548,998

60

95

%

30

%

(PTMEG)

가가 ,가

UV

60 100

. U - S - A - 4,533,729

가 가

30

3

. JP 64001

724 ( ) - , -

. US - A - 5,569,707 가

(sea

ling)

4 - 75%

US - A - 5,527,879

. US - A - 5,219,663

가

JP 08269394A

. US - A - 5,212,321

1,3 -

: US - A - 5,225,129 US - A - 5,849,859.

가

가

가

가

가,

a) 300 - 1300

가

;

b)

2 50 %가

;

c)

가

;

d) ;

e) 가

1 20% PTMC (damping) -

2 20% PTMC -

3 PC474

4 PT445

5 PC474 PT308 -

6 -

7 PTMC

8 PTMC

9 20% PTMC

10 50% PTMC

11 25 PTMC

12 25 PTMC

(PTMC )

가

가 PTMC

PTMC

, PTMC

PTMC  
가  
가  
가  
PTMC

PTMC

, PTMC

가

2-

가

가

가 가

가

2 4

가

N - ( 4 - )

N - ( 4 - )

1,3-

, 1,6-

2-

- 1,3-

가

가

가

( )

가

400

700

80

70  
140

187

가 가

가 가

587 . , S. C. Johnson Polymer , SCX 902, SCX 912 Joncryl<sup>R</sup>  
 , Bayer Corporation , Desmophen 670A

가  
, -4,4' - , -4,4' - , -2,4 -  
, -2,6 - , 3,3' - -4,4' - , - (4 -  
) ,  
, -1,2 - , -1,2 -  
, m - , p - , 3,3' - -4,4' -  
, 3,3' - -4,4' - , 3,3' - -4,4' - , 4,4' -  
, - , 3,3' - -4,4' - , - (2 - ) , 1,3,5 -  
, , ' , " - 3,3' -

tes Rhone - Poulenc Tolonate Polyisocyana

TMC 가 , P  
가

; , n - , n - ;  
가 ,  
/ , (PGMA) ,

, n - , 3 가 0 , 40% ,  
10 30% (MEK) 1

50 - 60% , 40 - 90%, 40 - 70%,  
40 - 70%, 50 - 60% . PTMC , PGMA  
 . PTMC , 5 - 50 %  
1.2:1 1:1 . NCO:OH 1.1:1 . NCO OH

가 , 가

, -n- , -n- , -n- , -n- , -n-  
 , ( ) , ( -n- ) , ( -n- )  
 , ( ) , n- , n- (2- )  
 ) , -n- , 1,3- -1,1,3,3- , -n-  
 - ( ) , -n- (2- ) , -n- (2- ) , -n-  
 ( ) , -n- (2,4- ) , -n- , -t-  
 , -n- -n- , -n- , -n- , -n-  
 , -n- -S,S'- ( ) , -n- , -n-  
 n- S'- ( ) , ( ) , -S,  
 , 1- -n- , -n- , -n- , -n-  
 -n- , -n- , -n- , -t- , -n-  
 ) , ( ) , 가 , ( -n- , -n- , -n- )  
 , -n- , -n- , -n- , -n-  
 ; N,N- ; 1,4- -2,2,2- , N,N,  
 N',N'- , N,N,N',N'- 1,3- N,N,N',N'- 1,6-  
 ; N,N,N',N'',N''- , N,N,N',N'',N''-  
 , N- , N.(N',N'- )- 1,2- , N- ,N'- (2- )  
 )- N- (2- ) , N,N,N'- , N- -N'- (2- )  
 (3- )- ; (2- )  
 가 가 가 ,  
 가 가 .

가	0.0001	0.1%	0.
004	0.01%, 가	0.006%	
60	15 - 30	100 - 160	20
	1	3	2 3
			140

(sanded)

가

0.5 - 5 %

( )

, 2,4- , 2,4- , 2,2',4' - , 2  
 - 4- - 3',5' - - t- , 2,2',4' - - 4' - , 2  
 - 4- - 2' - ; 2- - 4- (2',4' - )  
 ( : 2- (2' - - 5' - ) ) , 2- (2' -  
 - 4- ) , 2- (2' - - 5' - ) ) ; , 2- (2' -  
 - 4- , - 4- , - 1,3,5- , -s- -1,3,5-  
 ; , t- ,

가

0.5 , 35 % 1 80 %  
 , ,가 , 가

1  
 (PTMC )  
 PTMC

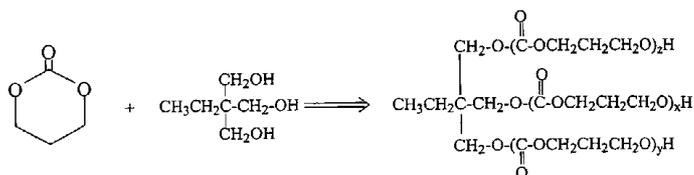
3

120

3

GC NMR

가



X = TMC 0

Y = TMC 0

Z = TMC 0

X+Y+Z = TMC

1 PTMC :

1

[ 1 ]

	P1	P2	P3
	55	75	85
	45	25	15
	100	180	300
	300	540	900
TMC	1.6	4	7.5

2

(PTMC )

PTMC 1,3- 가 1 , 1  
 (II) 2- , 50 ppm / .

2

(T<sub>g</sub>) 가 , , PTMC 가 .  
 T<sub>g</sub> . ,

(DSC) 가 가 가 . ,  
 가

PTMC , 가 가

2

[ 2 ]

PTMC	PC1336	PC 813	PC597	PC474	PC328	PT573	PT445	PT308	PT217	PT121
가										
	2672	1626	1194	948	656	1718	1336	924	651	363
	1336	813	597	474	328	573	445	308	217	121
T <sub>g</sub> ( )	-25.7	-30.2	-35.6	-40.9	-46.4	-26.3	-28.3	-35.9	-38.8	-48.9
( )	41.7	38.4	34.8	33.4	33.3	-----	-----	-----	-----	-----
(J/g)	39.0	32.3	17.8	7.0	0.3	-----	-----	-----	-----	-----
, Na Sn ppm	90 Sn	71 Sn	54 Sn	90 Sn	90 Sn10 Na	40 Na	40 Na	40 Na	45 Na	10 Na
2 - EH 53 ppm 18 ppm PC 813 , Sn (II) 2 - .										

3

3 PTMC PC813 . PTMC

3

3 " 가 "

(PGMA)가 PTMC 가 ,

, PGMA (MEK) . MEK

3

PC813

[ 3 ]

		n-			n-					
	I	I	I	S	I	I	S	S	S	I
60	S	S	S	S	S	I	S	S	S	I
	I	S	S	S	S	I	S	S	S	I
* 33% . : I, ; S, 가										

4

S. C. Johnson 100% Joncryl 587 PTMC  
가

Joncryl 587 94 가, 600 , 5 가 50 가 .  
가 가 가

Joncryl 587 (PGMA) 50% . PTMC  
PGMA MEK 50 - 60% . PTMC  
5, 10, 20 50%  
(Rhone Poulenc. Tolonate HDT - LV)

PC474 4 NCO OH 1.1 1  
 ( ) (DBTBL) 0.006% 4 - 6 가  
 (Q S - 36, S - 36 - I R - 36 - I) 2  
 , 20 140

4

PTMC

[ 4 ]

		PC474U05	PC474U10	PC474U20	PC474U50	PC474
	0%	5%	10%	20%	50%	100%
Joncryl 587 50%/PGMA	50	50	50	50	30	- - -
PC474, 50%/MEK	- - -	2.63	5.56	12.5	15	40
PC474, 50%/PGMA	- - -	- - -	- - -	- - -	15	10
MEK	5	6	5	5	- - -	- - -
PGMA	- - -	- - -	- - -	1.8	- - -	- - -
Tolonate HDT - LV	8.39	8.95	9.57	11.04	11.40	10.62
2% DBTDL	0.1002	0.1058	0.1120	0.1269	0.1242	0.1069
	53%	52%	53%	53%	58%	59%

5

5

S. C. Johnson Polymer  
4

Bayer Corporation

PTMC

가 가 가 . 20% PC597 (PGMA) (MEK) ,  
 가 / 가 가 PC474 60 가  
 가 (DMA)

X902 SCX912가 PTMC , S. C. Johnson SC  
 가 5 60

5

PTMC

가

[ 5 ]

		OH가				
			, 23		, 60	
			PC597	PC474	PC597	PC474
			PC597	PC474	PC597	PC474
1. EPS 3804	Acr.	194		-----		-----
2. SCX 902	Acr.	112				
3. SCX 912	Acr.	94				
4. Joncryl 587, 5%	Acr.	94				
5. SCX 907	Acr.	94				
6. SCX 920	Acr.	140				
7. SCX 910	Acr.	94		-----		-----
8. Desmophen 670A	PE	111				
9. Desmophen 680	PE	70				
10. Desmophen 650A	PE	173				
11. Joncryl 587 10%	Acr.	94				
12. Joncryl 587 20%	Acr.	94				
13. SCX 507	Acr.	140				
14. SCX 804	Acr.	43		---		---
15. Desmophen ALS	Acr.	92		---		---
16. G - cure 114A80	Acr.	70		---		---
17. Desmophen A365	Acr.	92		---		---
18. Joncryl 587 50%	Acr.	94				

: Acr., Johnson Polymer ; PE, Bayer Corporation

6 - 14 PTMC PC 474가 PC1336, PC813, PC597, PC328 PTMC  
 PT573, PT445, PT308, PT217 PT121 PTMC % ,  
 4 .  
 6  
 6 , 5, 10, 20 50% PTMC 가 PTMC  
 5( 5) 가  
 PTMC 가 .  
 , PC1336 5% 가 , PC328 50%  
 PT121 PT217 50% PT573 5% ,  
 PTMC 가  
 , ( , PC474 PT308  
 ). 6 :  
 6

[ 6 ]

PTMC	PC1336	PC813	PC587	PC474	PC328
5%					
10%					
20%					
50%					
PTMC	PT573	PT445	PT308	PT217	PT121
5%					
10%					
20%					
50%					

7

7 , , 4 , % 가

7 . 7 PC813, PC597 PC328 PTMC 5% 가

PTMC 가 가 ,

PC1336 PTMC , PT573 PTMC 5 10%가  
가 . PC1336 PT573

7

PTMC /

PTMC 함량	PC1336 Nm (in. lb.)	PC813 Nm (in. lb.)	PC597 Nm (in. lb.)	PC474 Nm (in. lb.)	PC328 Nm (in. lb.)
대조	6.2/2.3 (55/20)	6.2/2.3 (55/20)	6.2/2.3 (55/20)	6.2/2.3 (55/20)	6.2/2.3 (55/20)
5%	14.7/14.7 (130/130)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	15.8/15.8 (140/140)	18.1/18.1 (160/160)
10%	15.8/15.8 (140/140)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)
20%	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)
50%	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)
PTMC 함량	PT573 Nm (in. lb.)	PT445 Nm (in. lb.)	PT308 Nm (in. lb.)	PT217 Nm (in. lb.)	PT121 Nm (in. lb.)
대조	6.2/2.3 (55/20)	6.2/2.3 (55/20)	6.2/2.3 (55/20)	6.2/2.3 (55/20)	6.2/2.3 (55/20)
5%	14.7/14.7 (130/130)	18.1/18.1 (160/160)	14.7/16.9 (130/150)	13.6/15.8 (120/140)	10.2/10.2 (90/90)
10%	15.8/15.8 (140/140)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	15.8/15.8 (140/140)	15.8/15.8 (140/140)
20%	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)
50%	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)

8

8 , 가 7 가  
 24 가 가 -2  
 0 가 , PTMC 가 가  
 8

PTMC /

PTMC 함량	PC1336 Nm (in. lb.)	PC813 Nm (in. lb.)	PC597 Nm (in. lb.)	PC474 Nm (in. lb.)	PC328 Nm (in. lb.)
대조	2.48/<0.5 (22/<4)	2.48/<0.5 (22/<4)	2.48/<0.5 (22/<4)	2.48/<0.5 (22/<4)	2.48/<0.5 (22/<4)
5%	3.38/0.5 (30/4)	3.28/0.5 (29/4)	3.38/0.5 (30/4)	3.16/0.5 (28/4)	3.16/0.5 (28/4)
10%	4.29/1.13 (38/10)	4.29/1.36 (38/12)	4.29/1.13 (38/10)	4.07/1.36 (36/12)	3.61/1.13 (32/10)
20%	9.04/5.65 (80/50)	9.04/5.42 (80/48)	7.91/5.65 (70/50)	7.68/5.42 (68/48)	6.10/5.42 (54/48)
50%	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)
PTMC 함량	PT573 Nm (in. lb.)	PT445 Nm (in. lb.)	PT308 Nm (in. lb.)	PT217 Nm (in. lb.)	PT121 Nm (in. lb.)
대조	2.48/<0.5 (22/<4)	2.48/<0.5 (22/<4)	2.48/<0.5 (22/<4)	2.48/<0.5 (22/<4)	2.48/<0.5 (22/<4)
5%	3.39/0.68 (30/6)	3.39/0.79 (30/7)	3.61/0.68 (32/6)	3.39/0.5 (30/4)	3.16/0.5 (28/4)
10%	4.07/1.36 (36/12)	4.07/ 1.58 (36/14)	3.84/1.13 (34/10)	3.84/0.90 (34/8)	3.39/0.90 (30/8)
20%	10.17/5.87 (90/52)	9.71/6.33 (86/56)	7.23/4.97 (64/44)	6.33/4.52 (56/40)	5.65/4.07(50/36)
50%	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/18.1 (160/160)	18.1/15.8 (160/140)	13.56/11.30 (120/100)

9

9 , 4 PTMC 50%가  
 . PTMC 가  
 (DMA) 가  
 가 9

9

PTMC

PTMC 함량	PC1336	PC813	PC597	PC474	PC328	PT573	PT445	PT308	PT217	PT121
대조	F	F	F	F	F	F	F	F	F	F
5%	F	F	F	F	F	F	F	F	F	F
10%	F	F	F	F	F	F	F	F	F	F
20%	F	F	F	F	F	F	F	F	F	F
50%	HB	B	B	B	B	HB	HB	HB	HB	F

(DMA)

가 PTMC ( ) ( 1 2).  
 가 PTMC ( 3 4) PTMC T<sub>g</sub> PC474 PT445 PTM  
 PC328 50% 가 , PC1336 5% , PT121  
 PT217 50% 가 , PT573 5%가  
 가 , PTMC 가  
 가 , PTMC 가  
 , DMA PTMC  
 PC474 PT308 PTMC 5 가  
 가 ( 6). , DMA 가  
 PTMC (T<sub>g</sub>) ( , ). 7 8 PTMC  
 T<sub>g</sub>  
 T<sub>g</sub> , 가 가 PT308 T<sub>g</sub> T<sub>g</sub> PTMC  
 가 PTMC ( 9 10). PTMC  
 25 가 11 12 50% 가  
 가 , 가  
 PTMC 가

10

10 , PTMC

PGMA/MEK(70/30)

50%

10

PTMC

PTMC  
PTMC

PC474  
가

PT217

5 - 10%

PTMC

10

디올		트리올	
	점도 (센티푸아즈)		점도 (센티푸아즈)
대조	885	대조	885
20% PC1336	733	20% PT573	668
20% PC813	631	20% PT445	610
20% PC597	528	20% PT308	446
5% PC474	646	5% PT217	696
10% PC474	571	10% PT217	581
20% PC474	417	20% PT217	402
50% PC474	271	50% PT217	163
20% PC328	376	20% PT121	379

11

11 , PTMC

가

가

, - ,

. 20% PT

MC

( 11).

20 60 PTMC

12

PC328

PT217

PT121

PTMC

PTMC 50%

PTMC

PTMC

PTMC

DMA

11

[ 7 ]

	20 ° ,	60 ° ,	20 ° ,	60 ° ,
	104	120	88	97
20% PC328	102	116	87	97
20% PC474	95	104	87	96
20% PC597	91	99	88	96
20% PC813	89	97	86	95
20% PC1336	81	95	80	94

12

	광택, 20°	광택, 60°	대조	광택, 20°	광택, 60°
대조	104	120	대조	104	123
5%PC328	106	123	5%PT121	108	124
10%PC328	102	119	10%PT121	108	125
20%PC328	102	116	20%PT121	108	126
50%PC328	94	110	50%PT121	108	125
5%PC474	103	118	5%PT217	108	126
10%PC474	102	115	10%PT217	108	125
20%PC474	95	104	20%PT217	107	123
50%PC474	81	93	50%PT217	105	121
5%PC597	103	117	5%PT308	105	121
20%PC597	91	99	20%PT308	102	114
5%PC813	101	113	5%PT445	102	119
20%PC813	89	97	20%PT445	96	114
5%PC1336	96	107	5%PT573	99	113
20%PC1336	81	95	20%PT573	92	104

12

12 , PTMC 10% HCl, 10% NaOH, 가  
 24 , 13 , 10  
 가 1 , 가 가  
 . PTMC 가 가 .  
 가 5, 10 20% PTMC 가 ,  
 50% PTMC . PTMC 가  
 가 , PTMC T<sub>g</sub> 가

13a

샘플	HCl	NaOH	Gas.	미스타드	샘플	HCl	NaOH	Gas.	미스타드
대조	10	10	9	10	대조	10	10	9	10
PC1336	10	10	9	1	PT573	10	10	9	1
PC813	10	10	9	2	PT445	10	10	9	2
PC597	10	10	9	4	PT308	10	10	9	4
PC474	10	10	9	4	PT217	10	10	9	4
PC328	10	10	9	5	PT121	10	10	9	5
20% PC1336	10	10	9	10	20% PT572	10	10	9	10
20% PC813	10	10	9	10	20% PT445	10	10	9	10
20% PC597	10	10	9	10	20% PT308	10	10	9	10
20% PC474	10	10	9	10	20% PT217	10	10	9	10

13b

샘플	HCl	NaOH	Gas.	미스타드	샘플	HCl	NaOH	Gas.	미스타드
20% PC328	10	10	9	10	20% PT121	10	10	9	10
50% PC1336	10	10	9	9	50% PT573	10	10	9	9
10%PC1336	10	10	9	10	10% PT573	10	10	9	10
5% PC1336	10	10	9	10	5% PT573	10	10	9	10
50% PC597	10	10	9	8	50% PT308	10	10	9	8
10% PC597	10	10	9	10	10% PT308	10	10	9	10
5% PC597	10	10	9	10	5% PT308	10	10	9	10
50% PC328	10	10	9	8	50% PT121	10	10	9	8
10% PC328	10	10	9	10	10% PT121	10	10	9	10
5% PC328	10	10	9	10	5% PT121	10	10	9	10

13

가 13 , (rub) 가 MEK , 200  
 50% PTMC PC1336 , 200  
 14

14

MEK

PTMC 폴리올 함량	PC1336	PC813	PC597	PC474	PC328
대조	>200	>200	>200	>200	>200
5%	>200	>200	>200	>200	>200
10%	>200	>200	>200	>200	>200
20%	>200	>200	>200	>200	>200
50%	190	200	200	>200	>200
PTMC 폴리올 함량	PT573	PT445	PT308	PT217	PT121
대조	>200	>200	>200	>200	>200
5%	>200	>200	>200	>200	>200
10%	>200	>200	>200	>200	>200
20%	>200	>200	>200	>200	>200
50%	>200	>200	>200	>200	>200

14

14 , PTMC / Q - UV 가 15  
 . Q - UV PTMC /  
 PTMC  
 1 가 60 500 UVA 340 .  
 0 , (Q S - 361) , PTMC  
 ASTM D4587 - 9  
 140 2

15

UV

샘플	색		Q-UV 시험			
	색 B	황변 지수	색 B 변화	YI 변화	광택 유지	광택 유지
대조	4.97	11.0	0.72	1.61	99%	99%
20% PC328	4.76	10.56	0.66	1.58	99%	99%
5% PT474	4.57	10.14	0.62	1.4	99%	99%
10% PT474	4.52	10.00	0.68	1.56	99%	99%
20% PC474	4.49	10.23	0.71	1.65	97%	99%
5% PC597	4.82	10.73	0.72	1.61	99%	99%
10% PC597	4.7	10.22	0.68	1.65	99%	99%
20% PC507	4.56	10.21	0.62	1.42	97%	99%
20% PC813	4.36	9.69	0.72	1.63	96%	99%
20% PC1336	4.29	9.57	0.62	1.42	91%	98%
20% PT121	4.81	10.56	0.71	1.65	99%	99%
20% 217	4.82	10.65	0.77	1.80	99%	99%
20% PT308	4.76	10.56	0.77	1.78	99%	99%

15

15 , 20% PTMC597 Joncryl 587 DuPon  
t TiO<sub>2</sub> , NCO/OH 1.05/1 /  
0.7/1 가 140 20 2  
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PTMC

샘플	연필 경도	점착성	전면 충격 Nm (in- lb)	후면 충격 Nm (in- lb)	내습성 (시간)	24 - 시간 스왓 시험			
						HCl	NaOH	가솔린	머스타드
대조	H	5B	2.7(24)	0.9(8)	>1000	10	10	9	10
20% PC597	H	5B	9.0(80)	5.6(50)	>1000	10	10	9	10
샘플	색 B	황변 지수	광택 20°	광택 60°	MEK 이중 텀	Q-UV 시험			
						광택 20°	광택 60°	색 B 변화	YI 변화
대조	-0.67	-1.05	73	87	>200	70	86	0.16	0.25
20% PC597	-0.81	-1.26	70	86	>200	69	85	0.07	0.10

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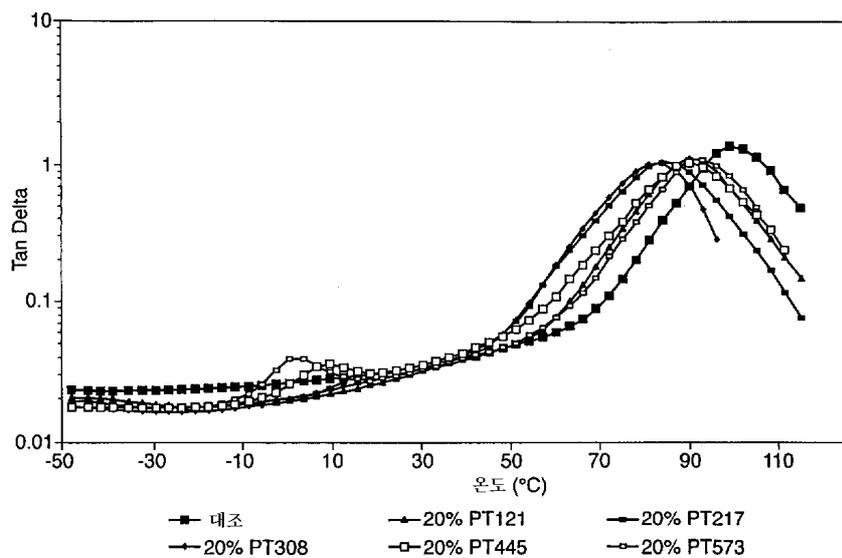
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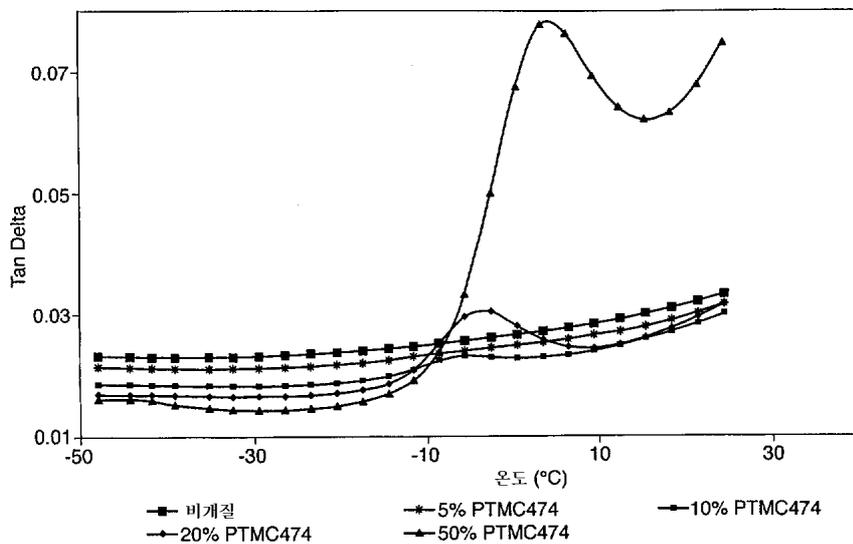
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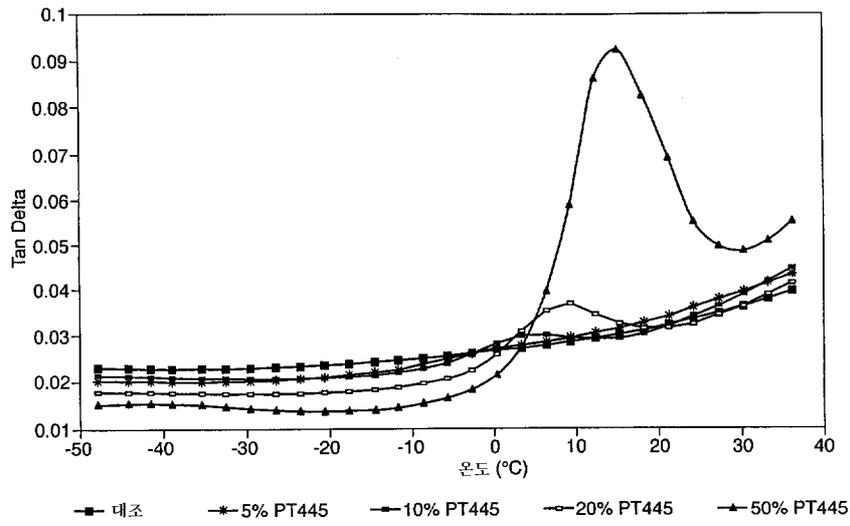
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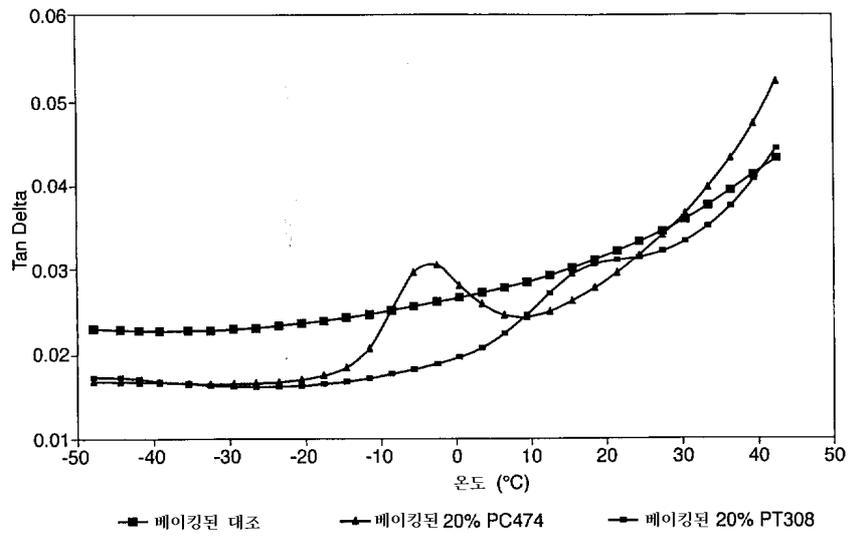
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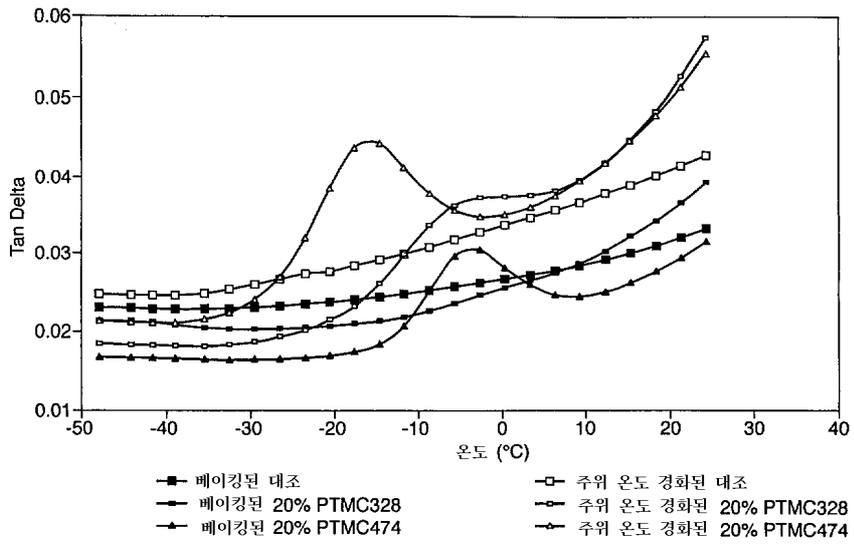
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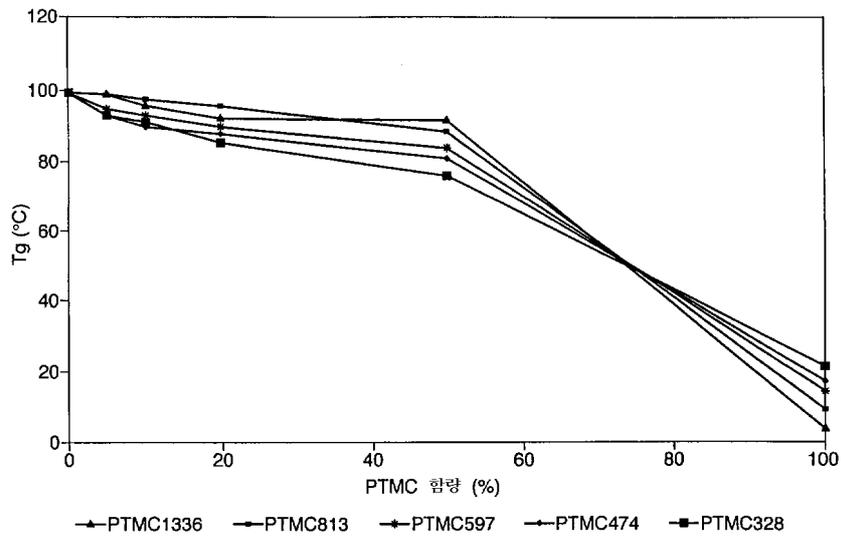
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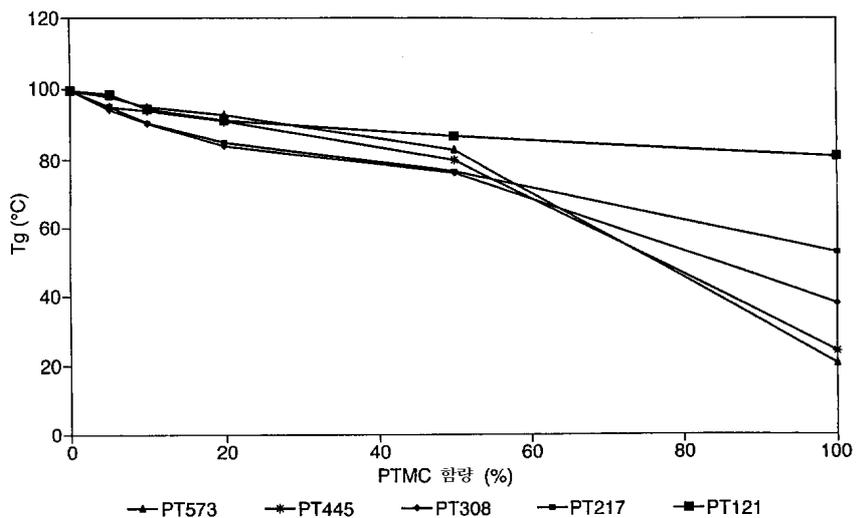
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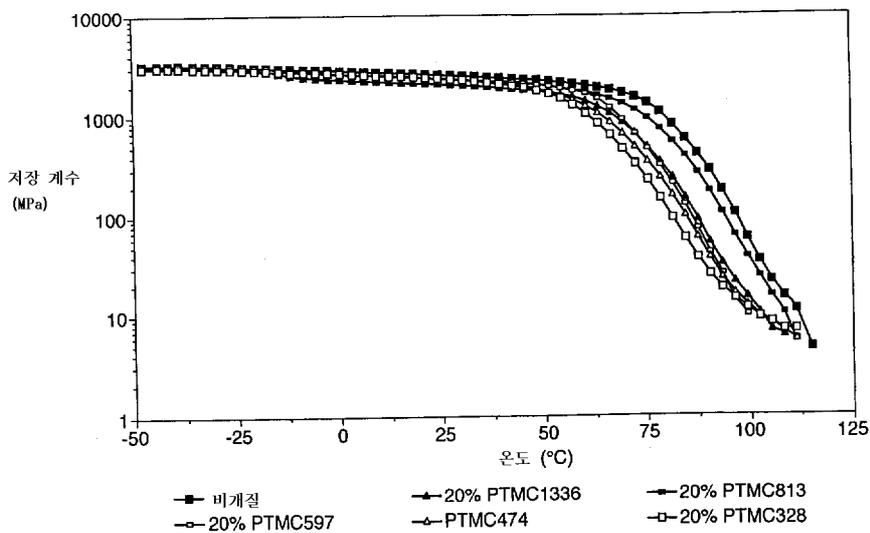
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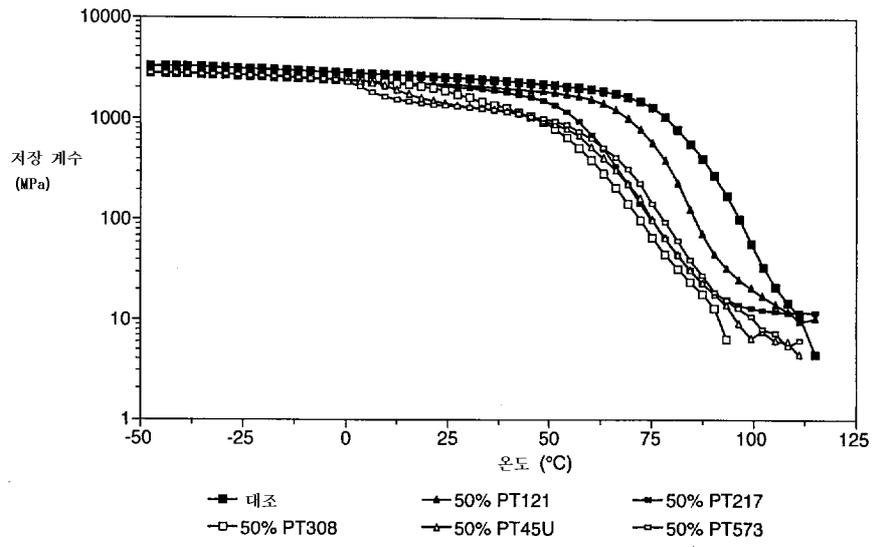
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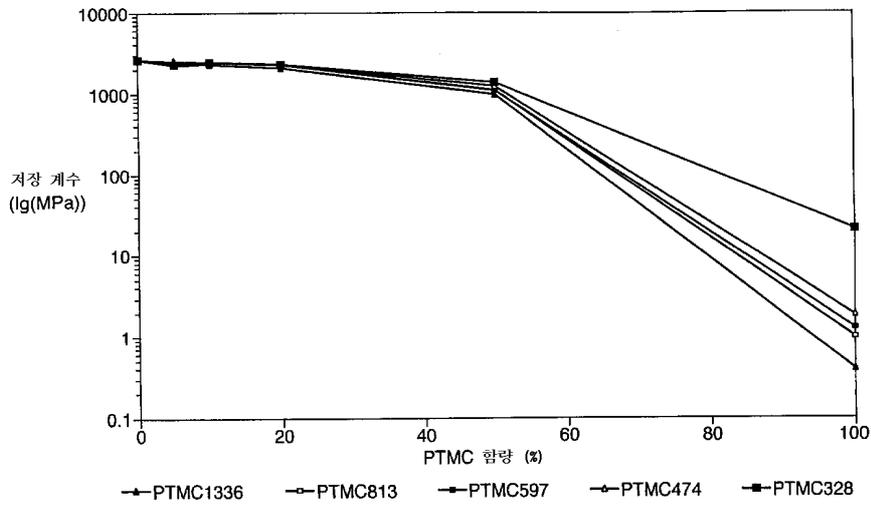
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