

القبول
09/05/2007

الاستلام
14/01/2007

Abstract

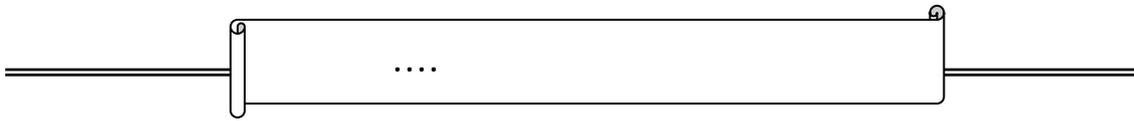
In this work, comparative isothermal and differential thermal analysis of epoxy-polyurea / metal blends were investigated. IGA measurements show fast loss in weight in the first 20 minutes before they reached a constant weight, while the period where about 25 minutes for epoxy alone. This behaviour was explained by the strong network formed by the polyurea complex with epoxy which diminishes its decomposition. Meanwhile, DTA thermograms of most blends show two distinct exotherms (T_2 and T_4) while these exotherms are small and not clear in case of epoxy alone. This behaviour may explained by the presence of the metal ions through the blends which promotes the oxidation process.

25

20

 T_4 T_2 T_4 T_2

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(2 1)

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(3)

(4)

(6 5)

(9-7)

(12-10)

:

Lyco-Pox 103

.1

-6 2

-4 1

-2 1 :

.2

.() (B.D.H.) (Fluka)

MnCl₂.4H₂O CoCl₂.6H₂O CuCl₂.2H₂O NiCl₂.6H₂O : .3

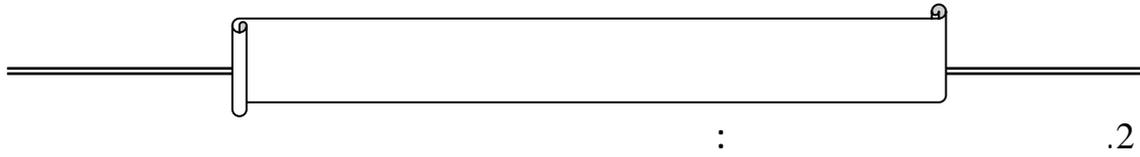
.CrCl₂.6H₂O

: .1

(13)

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- Poly (N,N`-1,4-phenylene urea); PPU
- Poly (N,N`-1,2-phenylene urea); POU
- Poly (N,N`-2,6-toluidine urea); PTU
- Poly (N,N`-Benzidine urea); PBU



(14)

.(1)

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.3

(1:1)

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Isothermal Gravimetric Analysis

.4

IGA

:(IGA)

(15)

:Differential Thermal Analysis (DTA)

.5

(15)

DTA

[MLCl.H₂O]Cl

PBU PPU .2

PTU POU .1

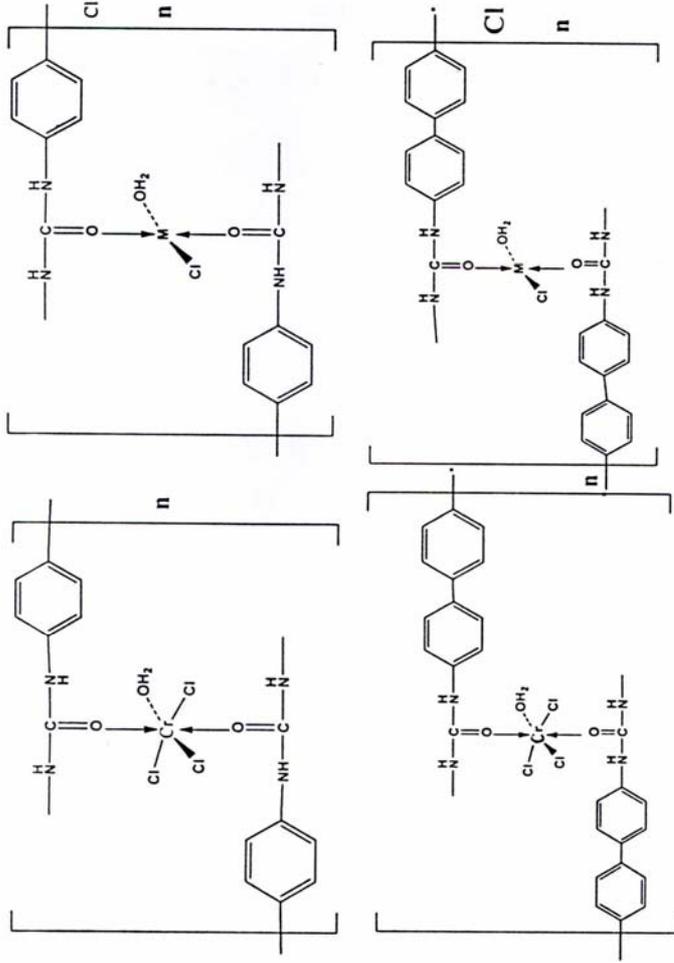
[ML₂Cl₂] Co(II), Ni(II), Cu(II)

Mn(II), Co(II), Ni(II), Cu(II) [MLCl.H₂O]Cl

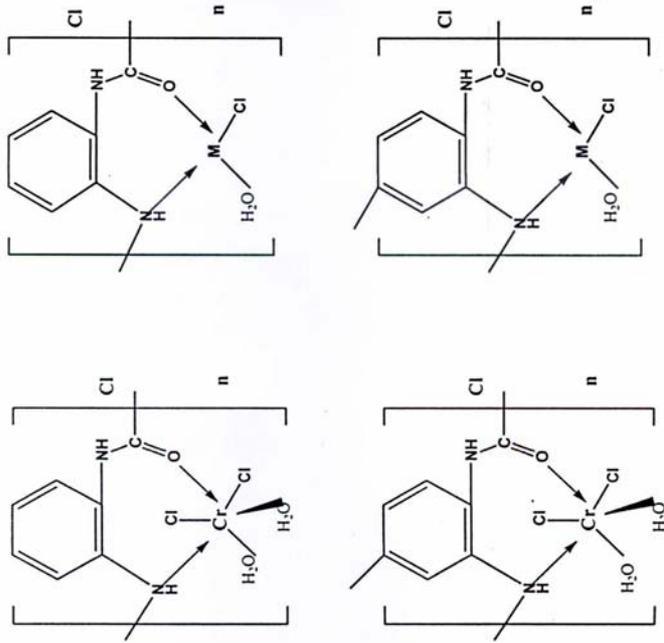
[ML₂Cl₃H₂O]

Cr(III) Mn(II)

Cr(III) [MLCl₂(H₂O)₂]Cl



M = Co⁺², Ni⁺², Cu⁺²

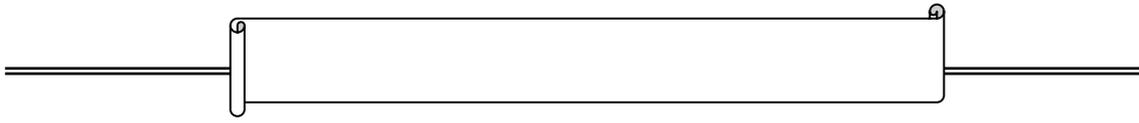


M = Mn⁺², Co⁺², Ni⁺², Cu⁺²



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(1)



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(6-2)

(IGA)

60 (°350)

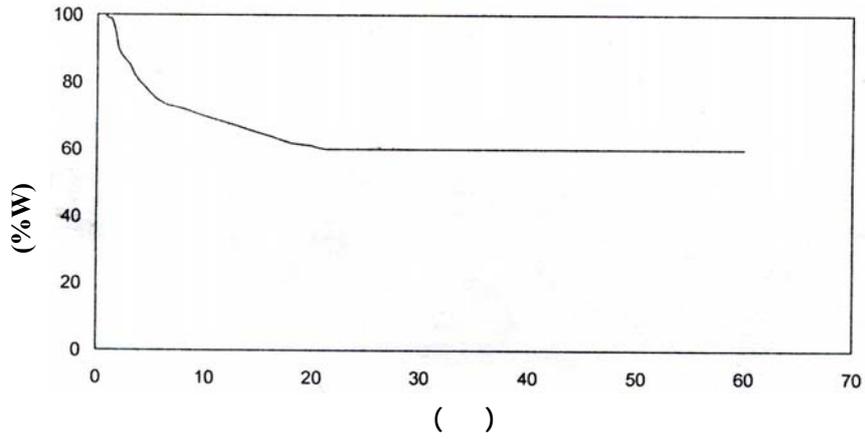
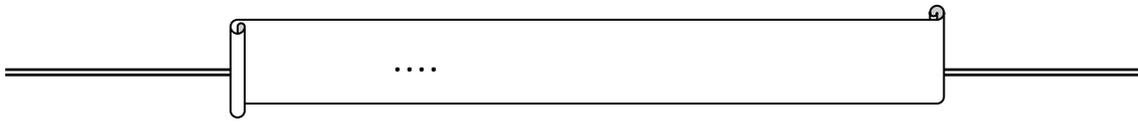
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.(1)

20

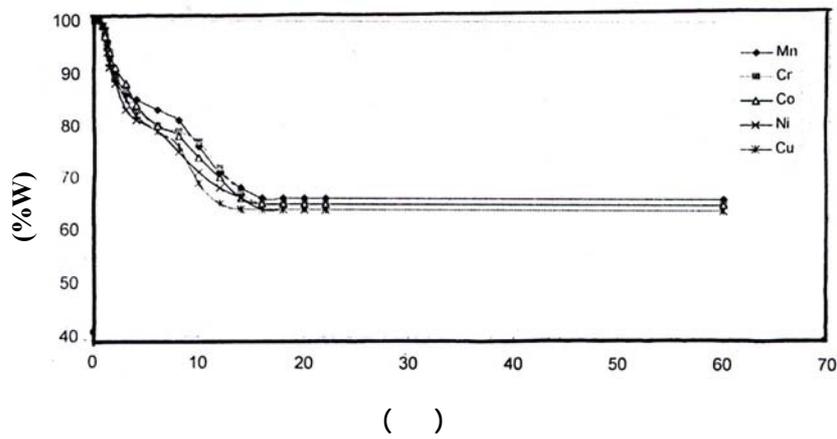
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(°350)

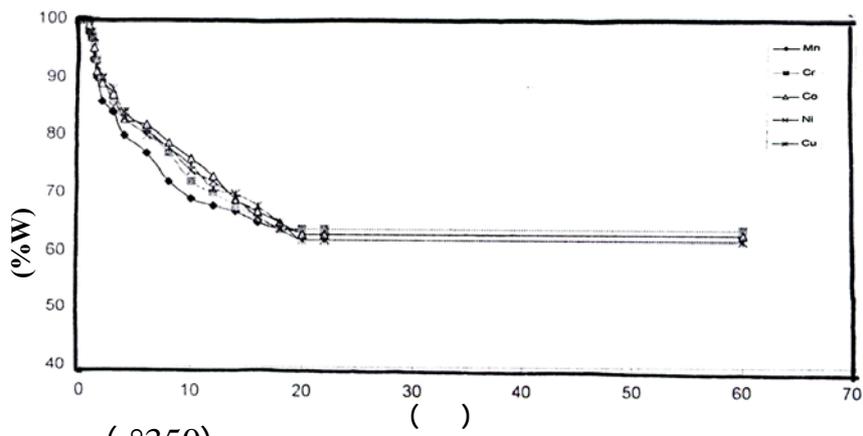
(2)



(°350)

(3)

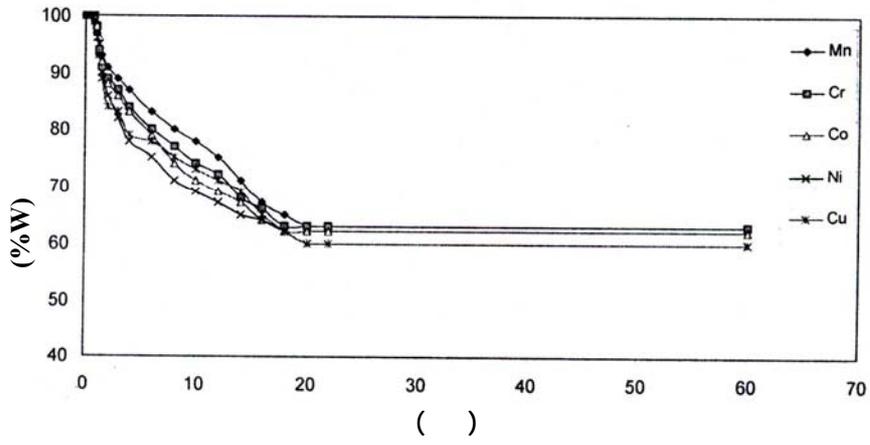
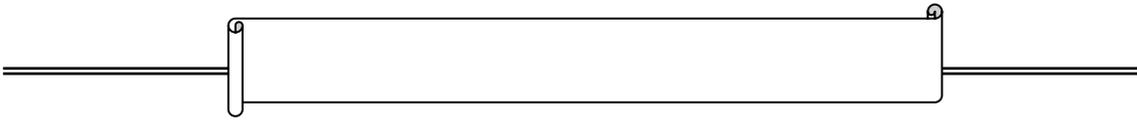
PBU



(°350)

(4)

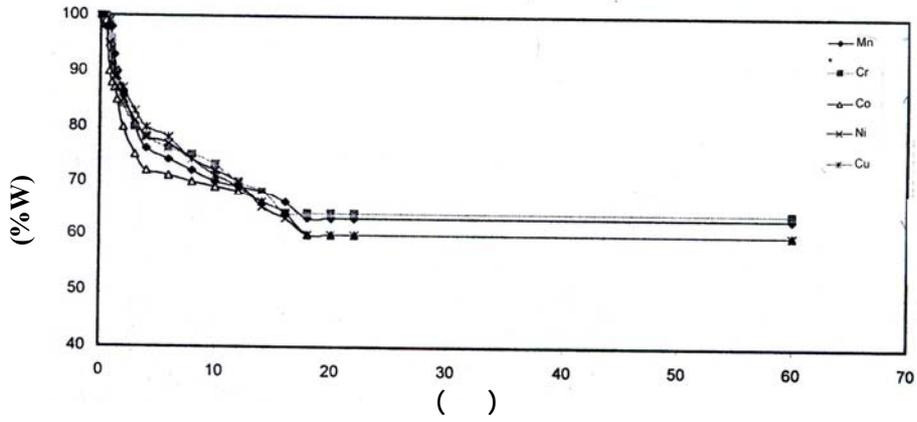
PPU



(°350)

(5)

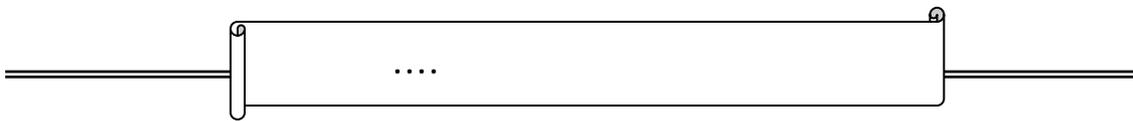
POU



(°350)

(6)

PTU



(1)

(°350)

		(W%)				
		5 (min)	10(min)	15(min)	20(min)	60(min)
E-PBU	Mn	89	76	67	66	66
	Cr	82	77	66	65	65
	Co	82	74	66	64	65
	Ni	80	71	65	64	64
	Cu	81	72	65	64	64
E-PPU	Mn	79	69	66	64	64
	Cr	83	72	67	63	64
	Co	83	76	68	62	63
	Ni	82	74	68	62	62
	Cu	83	75	69	63	62
E-POU	Mn	85	78	69	63	63
	Cr	82	74	67	63	63
	Co	81	71	66	62	62
	Ni	77	69	63	60	60
	Cu	79	73	67	60	60
E-Ptu	Mn	75	70	67	63	63
	Cr	77	73	66	64	64
	Co	72	69	65	60	60
	Ni	78	72	64	60	60
	Cu	79	71	65	60	60
E	-	75	65	60	58	55

.2

10 5)

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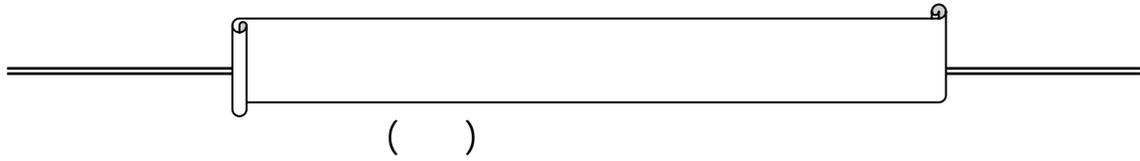
E-PBU > E-PPU > E-POU > E-PTU

(17)

(16)

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PTU



(DTA) (7)

. °700-25

(Exo)

(8)

.(Endo)

DTA

(T_g) :

.(16)

(T_c)

(T_x)

(T_m)

(T_a) .

(T₁) :

(6)

(T₃)

(T₂)

(T₅)

(T₄)

DTA

T₅-T₁

.(2)

(7)

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()

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T₁

.1

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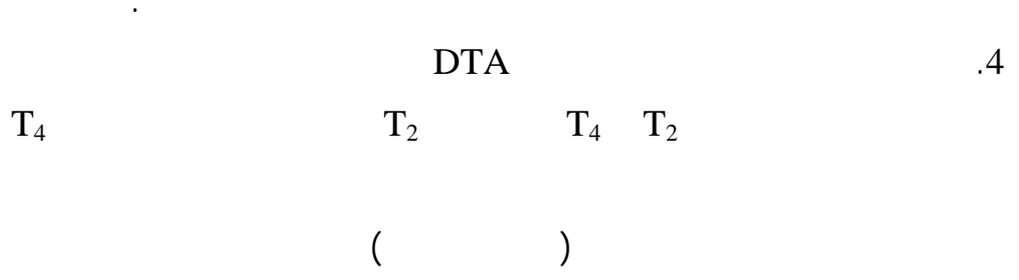
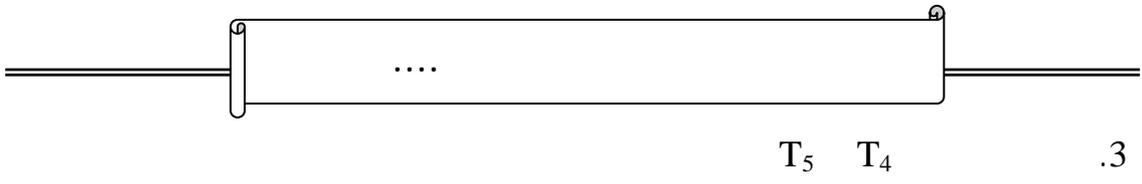
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T₂

.2

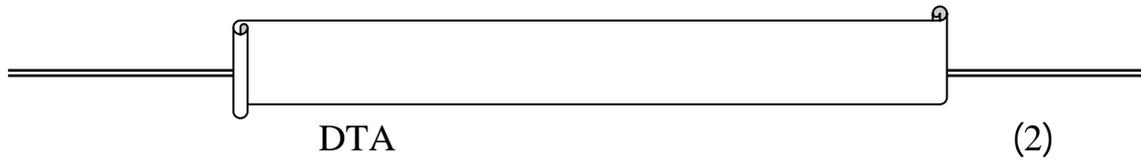
POU

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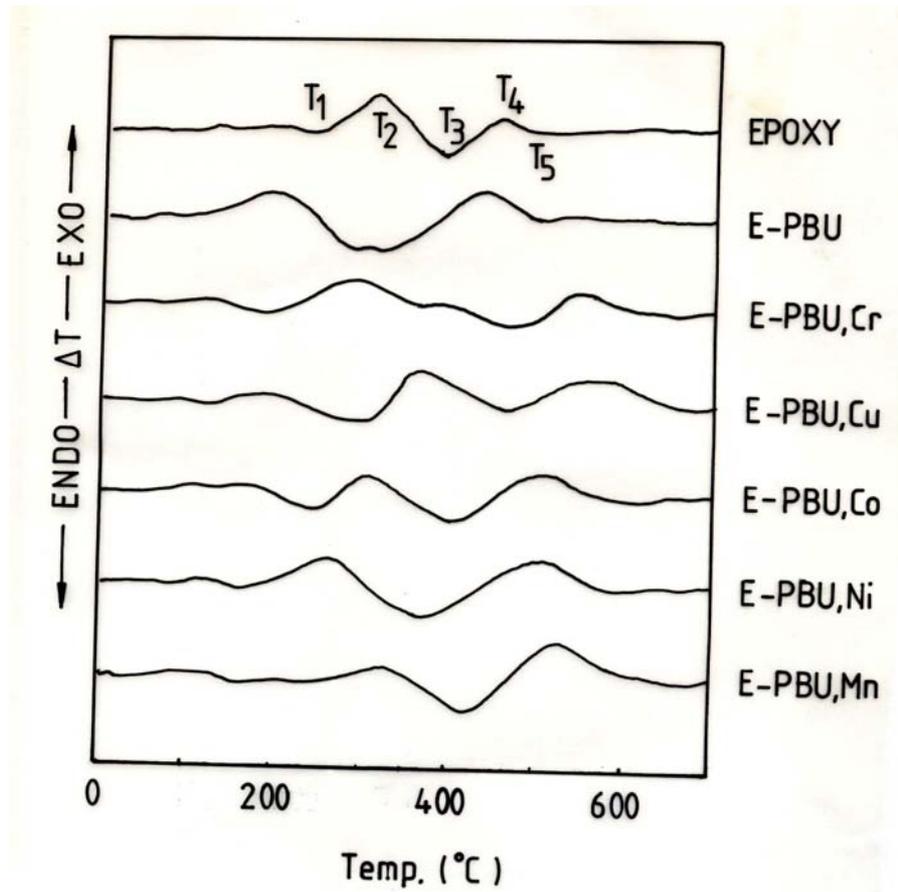
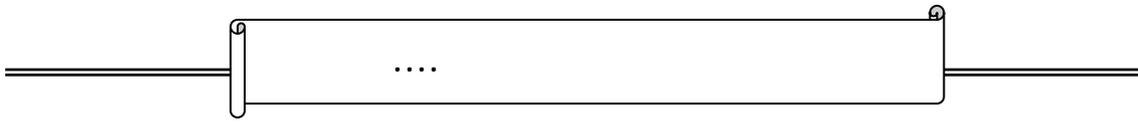
.DTA

(18)

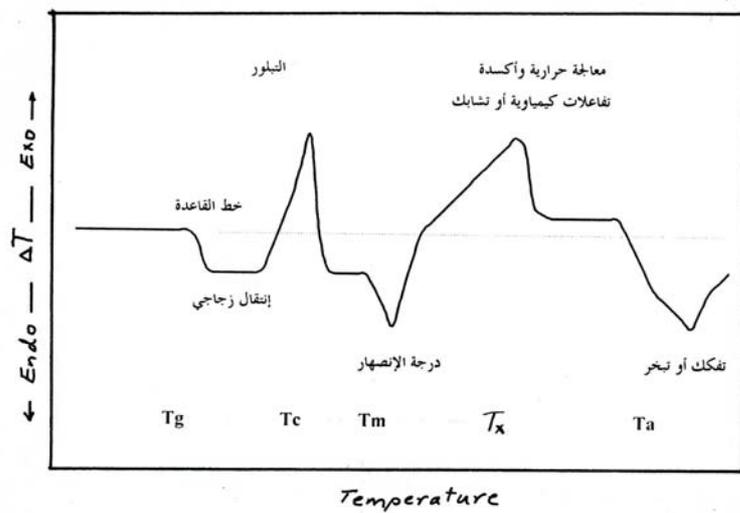


	T₁	T₂	T₃	T₄	T₅
E (Epoxy)	250	315	358	450	480
E-PBU	175	210	300	425	500
E-PBU-Cr	200	300	460	560	600
E-PBU-Cu	290	365	460	550	600
E-PBU-Co	250	310	420	515	610
E-PBU-Ni	175	270	360	500	580
E-PBU-Mn	275	320	415	525	620
E-PPU	200	295	400	500	575
E-PPU-Cr	305	340	460	530	610
E-PPU-Cu	220	345	460	570	630
E-PPU-Co	220	300	430	525	600
E-PPU-Ni	300	350	440	550	630
E-PPU-Mn	250	360	400	470	450
E-POU	270	330	430	500	610
E-POU-Cr	200	325	420	520	600
E-POU-Cu	350	425	530	-	-
E-POU-Co	300	400	550	-	-
E-POU-Ni	250	350	500	-	-
E-PBU-Mn	340	420	550	-	-
E-PTU	170	260	375	480	580
E-PTU-Cr	250	315	430	520	610
E-PTU-Cu	260	320	475	610	670
E-PTU-Co	200	300	460	620	680
E-PTU-Ni	250	330	450	525	620
E-PTU-Mn	200	300	375	500	610

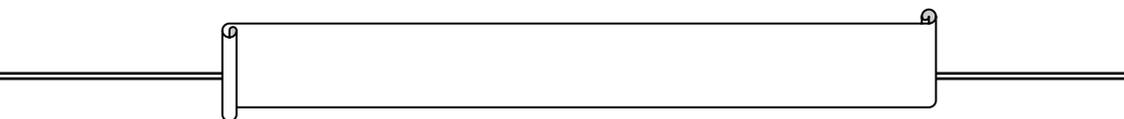
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(7)



DTA (8)



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