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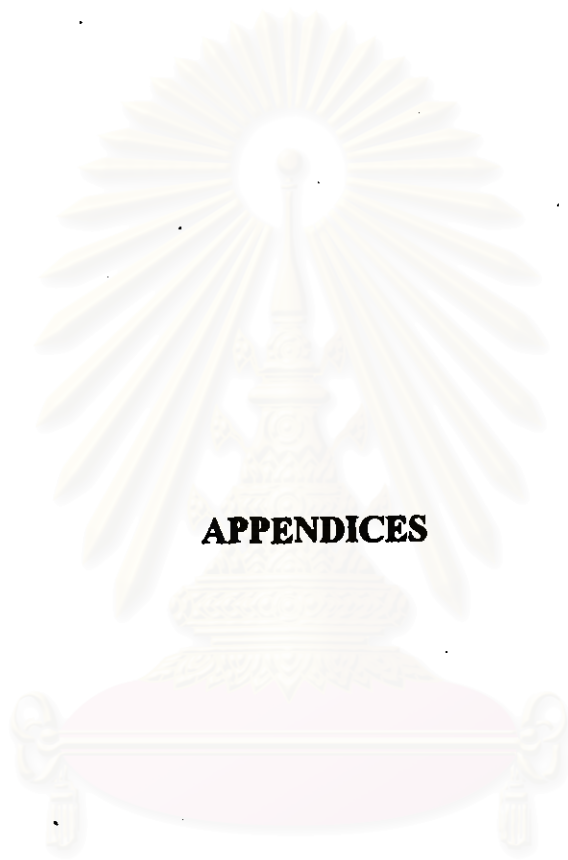
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APPENDICES

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APPENDIX A

Raw data for bending strength, contact area, and bridge diameter of resin-bonded sand

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Table A-1 The bending strength of standard formula resin coated sand from experimental

Amount of resin, %	Bending strength, kg/cm ²					Stick point, °C	AFS Fineness number.	
1.7% FD-1 (AUS sand)	20	17	21	21	23	101	56.7	
	21	20	22	20	16	98.4	57.5	
	16	17	21	20	16	98	56	
	Mean	19.4					99.1	56.7
	SD	2.4					1.6	0.7
2.1% FD-1 (AUS sand)	19	19	24	22	25	97	55	
	19	19	25	26	24	97.5	55.5	
	19	26	25	20	19	98	55	
	Mean	22.1					97.5	55.2
	SD	3.0					0.5	0.3
2.4% FD-1 (AUS sand)	23	26	31	27	27	99	55	
	30	32	34	31	23	98.5	54.5	
	26	29	32	32	27	97	55	
	Mean	28.7					98.2	54.8
	SD	3.4					1.0	0.3
3.2% FD-1 (Reclaimed)	33	36	37	39	37	95	53	
	32	38	43	39	39	97	52.5	
	34	39	37	36	34	97.5	53	
	Mean	36.9					96.5	52.8
	SD	2.9					1.3	0.3

Table A-1 (continue)

Amount of resin, %	Bending strength, kg/cm ²					Stick point, °C	AFS Fineness number.
2.7%PSM6412 (Rayong sand)	51	47	46	47	50	85	51.7
	47	45	56	47	47	84	52
	52	41	39	44	40	84	52.4
Mean	46.6					84.3	52.0
SD	4.6					0.6	0.4
4.3%PSM6412 (Rayong sand)	71	69	60	59	66	85	48
	63	62	69	66	66	84	49
	59	70	65	66	60	85.7	48.3
Mean	64.7					84.9	48.4
SD	4.1					0.9	0.5

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Table A-2 The Properties of resin blends coated sand of various Thai resin
(2.7%PSM-6412 with Rayong sand)

Resin used, %	Bending strength, kg/cm ²					Stick point, °C	AFS Fineness number.	
0	51	47	46	47	50	85	51.7	
	47	45	56	47	47	84	52	
	52	41	39	44	40	84	52.4	
	Mean	46.6					84.3	52.0
	SD	4.6					0.6	0.4
20	39	39	44	39	34	91	52	
	40	37	40	42	37	92	53.4	
	34	35	45	39	40	91	52.2	
	Mean	38.9					91.3	52.5
	SD	3.2					0.6	0.8
40	29	30	31	29	38	93	53.1	
	28	31	34	35	32	93.5	52.7	
	26	30	34	32	30	92	52.7	
	Mean	31.3					92.8	52.8
	SD	3.0					0.8	0.2
60	24	23	25	22	24	92	52	
	22	28	30	24	24	93	51.2	
	22	24	25	25	23	94	50.7	
	Mean	24.3					93.0	51.3
	SD	2.2					1.0	0.7

Table A-2 (continue)

Thai resin used, %	Bending strength, kg/cm ²					Stick point, ° C	AFS Fineness number
80	25	20	26	21	23	95.5	52.4
	23	24	24	23	26	95	51.6
	23	24	26	24	22	96	50
Mean	23.6					95.5	51.3
SD	1.8					0.5	1.2
100	23	18	20	22	16	96	52
	26	19	23	20	20	99	50.7
	20	22	21	20	19	102	51.2
Mean	20.6					99.0	51.3
SD	2.4					3.0	0.7

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**Table A-3 The Properties of resin blends coated sand of various Thai resin
(2.7%PSM-6412 with reclaimed sand)**

Thai resin used, %	Bending strength, kg/cm ²					Stick point, ^o C	AFS Fineness number.	
0	60	64	-	72	62	87	50	
	56	51	65	60	66	86	49.6	
	59	55	66	64	60	86.5	50	
	Mean	61.4					86.5	49.9
	SD	5.3					0.5	0.2
20	54	49	59	50	59	87	50	
	53	54	54	58	61	88	49.4	
	54	54	61	51	57	88	49	
	Mean	55.2					87.7	49.5
	SD	3.8					0.6	0.5
40	44	41	52	45	50	89	48.7	
	45	47	50	48	45	89.4	49.3	
	48	46	46	45	44	91	50.2	
	Mean	46.4					89.8	49.4
	SD	2.8					1.1	0.8
60	35	-	38	35	34	90	49	
	32	37	38	35	33	91	50.1	
	35	39	39	36	34	91.5	49.7	
	Mean	35.5					90.8	49.6
	SD	2.1					0.8	0.6

Table A-3 (continue)

Amount of Thai resin, %	Bending strength, kg/cm ²					Stick point, °C	AFS Fineness number.	
80	26	25	28	26	28	93	49.8	
	25	28	29	28	26	94	50.2	
	24	29	29	28	26	94	48.9	
Mean	27.0					93.6	49.6	
SD	1.6					0.6	0.7	
100	24	25	30	22	29	98	48	
	24	29	30	25	24	99	48.2	
	22	25	27	27	20	101	49	
	Mean	25.5					99.3	48.4
	SD	3.1					1.5	0.5

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**Table A-4 The Properties of resin blends coated sand of various Thai resin
(4.3 %PSM-6412 with Rayong sand)**

Amount of Thai resin, %	Bending strength, kg/cm ²					Stick point , °C	AFS Fineness number.	
0	58	68	69	62	60	83	51	
	59	67	81	56	73	84	50	
	61	67	68	60	57	83	51.4	
	Mean	64.4					83.3	50.8
	SD	6.9					0.6	0.7
20	58	54	59	62	61	85	51	
	59	49	64	60	61	86	50.2	
	56	54	59	60	54	86	49.7	
	Mean	58.0					85.7	50.3
	SD	3.9					0.6	0.7
40	46	42	53	50	53	87	49.4	
	47	42	53	48	59	88	49	
	44	47	51	49	50	87	50	
	Mean	48.9					87.3	49.5
	SD	4.6					0.6	0.5
60	37	44	46	44	43	91	51	
	38	44	44	46	42	92	52	
	38	44	47	44	37	92	51.4	
	Mean	42.5					91.7	51.5
	SD	3.4					0.6	0.5

Table A-4 (continue)

Amount of Thai resin, %	Bending strength, kg/cm ²					Stick point, °C	AFS Fineness number.
80	40	37	41	43	45	94	50.6
	41	38	41	42	41	95	50
	40	42	45	39	37	95	51
Mean	40.8					94.7	50.5
SD	2.5					0.6	0.5
100	29	36	35	35	30	99	52
	32	34	39	34	42	101	51
	31	34	39	30	27	102	50
Mean	33.8					100.7	51
SD	4.1					1.5	1.0

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Table A-5 The Properties of resin blends coated sand of various Thai resin
(4.3 % PSM-6412, reclaimed sand)

Amount of Thai resin, %	Bending strength, kg/cm ²					Stick point, °C	AFS Fineness number.	
0	78	71	88	74	76	83	48.2	
	72	76	74	73	67	82	49	
	71	75	77	72	71	84	50	
	Mean					73.4	83	49.1
	SD					3.0	1.0	0.9
20	67	71	62	57	70	85	49.5	
	64	68	64	70	69	85.3	50	
	64	68	71	59	61	85	51	
	Mean					65.7	85.1	50.2
	SD					4.5	0.2	0.8
40	58	59	63	56	65	87	48	
	51	54	64	57	56	86	49	
	57	57	62	72	65	86	50	
	Mean					59.7	86.3	49.0
	SD					5.4	0.6	1.0
60	53	44	52	62	50	90	50.5	
	53	50	61	52	54	91	49	
	54	56	60	57	52	91.5	51	
	Mean					54.0	90.8	50.2
	SD					4.7	0.8	1.0

Table A-5 (continue)

Amount of Thai resin, %	Bending strength, kg/cm ²					Stick point, °C	AFS Fineness number.
80	42	42	52	54	49	98	50
	49	50	50	54	54	97	49
	48	49	48	51	48	96.5	49.5
Mean	49.3					97.2	49.5
SD	3.8					0.8	0.5
100	36	43	49	46	47	99	49.5
	41	37	42	43	38	98	50
	41	35	44	43	36	99	50.5
Mean	41.4					98.7	50.0
SD	4.3					0.6	0.5

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Table A-6 The relation of the resin used, contact area, and bridge diameter of various resins used

Resin used,%	Contact area, $\text{cm}^2 \times 10^{-3}$	Bridge diameter, μm	
1.7% FD-1	0.96	35	
	0.49	25	
	0.71	30	
	0.31	20	
	0.71	30	
	Mean	0.6	28
	SD	0.3	5
2.1% FD-1	1.96	50	
	0.71	30	
	1.26	40	
	0.92	35	
	1.26	40	
	Mean	1.2	39
	SD	0.5	7
2.4% FD-1	1.59	45	
	1.59	45	
	1.96	50	
	1.59	45	
	1.59	45	
	Mean	1.7	46
	SD	0.2	2

Table A-6 (continue)

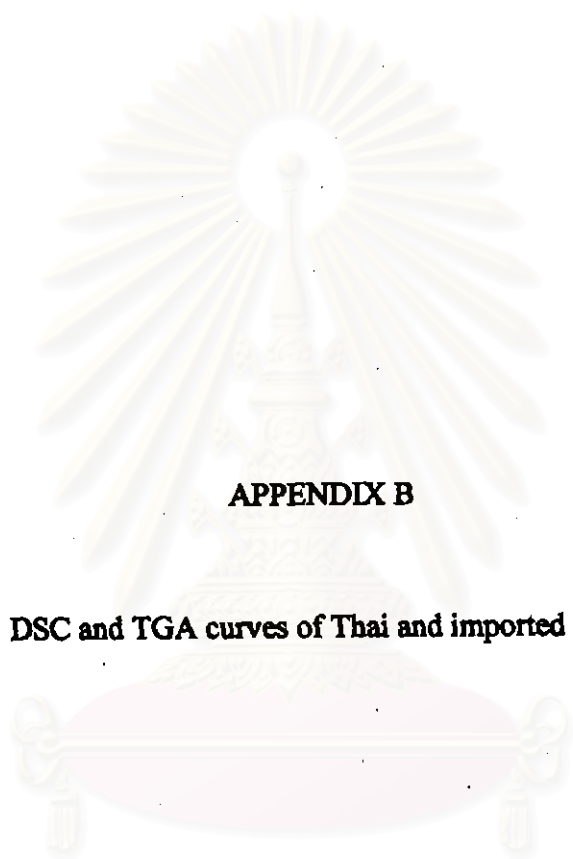
Resin used,%	Contact area, $\text{cm}^2 \times 10^{-5}$	Bridge diameter, μm	
3.2% FD-1	3.85	70	
	4.42	75	
	1.59	45	
	3.85	70	
	3.85	70	
Mean	3.5	66	
SD	1.1	12	
2.7% PSM-6412	5.68	85	
	6.36	90	
	5.68	85	
	5.03	80	
	2.83	60	
	Mean	5.1	80
	SD	1.4	17
4.3% PSM-6412	7.86	100	
	7.86	100	
	7.86	100	
	6.36	90	
	9.51	110	
	Mean	7.9	100
	SD	1.1	10

Table A-7 The relation of the Thai resin used, contact area, and bridge diameter in resin blends (PSM-FD) coated sand (standard formula of 2.7% PSM, with reclaimed sand)

Thai resin used,%	Contact area, $\text{cm}^2 \times 10^{-5}$	Bridge diameter, μm	
0	8.66	105	
	3.32	65	
	7.86	100	
	4.42	75	
	7.86	100	
	Mean	6.4	89
	SD	2.4	18
20	6.36	90	
	6.36	90	
	4.42	75	
	6.36	90	
	2.83	60	
	Mean	5.3	81
	SD	1.6	13
40	7.09	95	
	5.03	80	
	3.85	70	
	3.32	65	
	3.85	70	
	Mean	4.9	76
	SD	3.0	12

Table A-7 (continue)

Thai resin used,%	Contact area, $\text{cm}^2 \times 10^{-5}$	Bridge diameter, μm
60	5.03	80
	3.32	65
	1.59	45
	1.96	50
	3.32	65
	3.0	61
SD	1.4	14
80	2.83	60
	3.32	65
	2.83	66
	3.32	65
	1.96	50
	2.8	60
	SD	0.6
100	1.59	45
	1.96	50
	2.38	55
	3.85	70
	3.85	70
	2.7	58
	SD	1.1



APPENDIX B

DSC and TGA curves of Thai and imported resin

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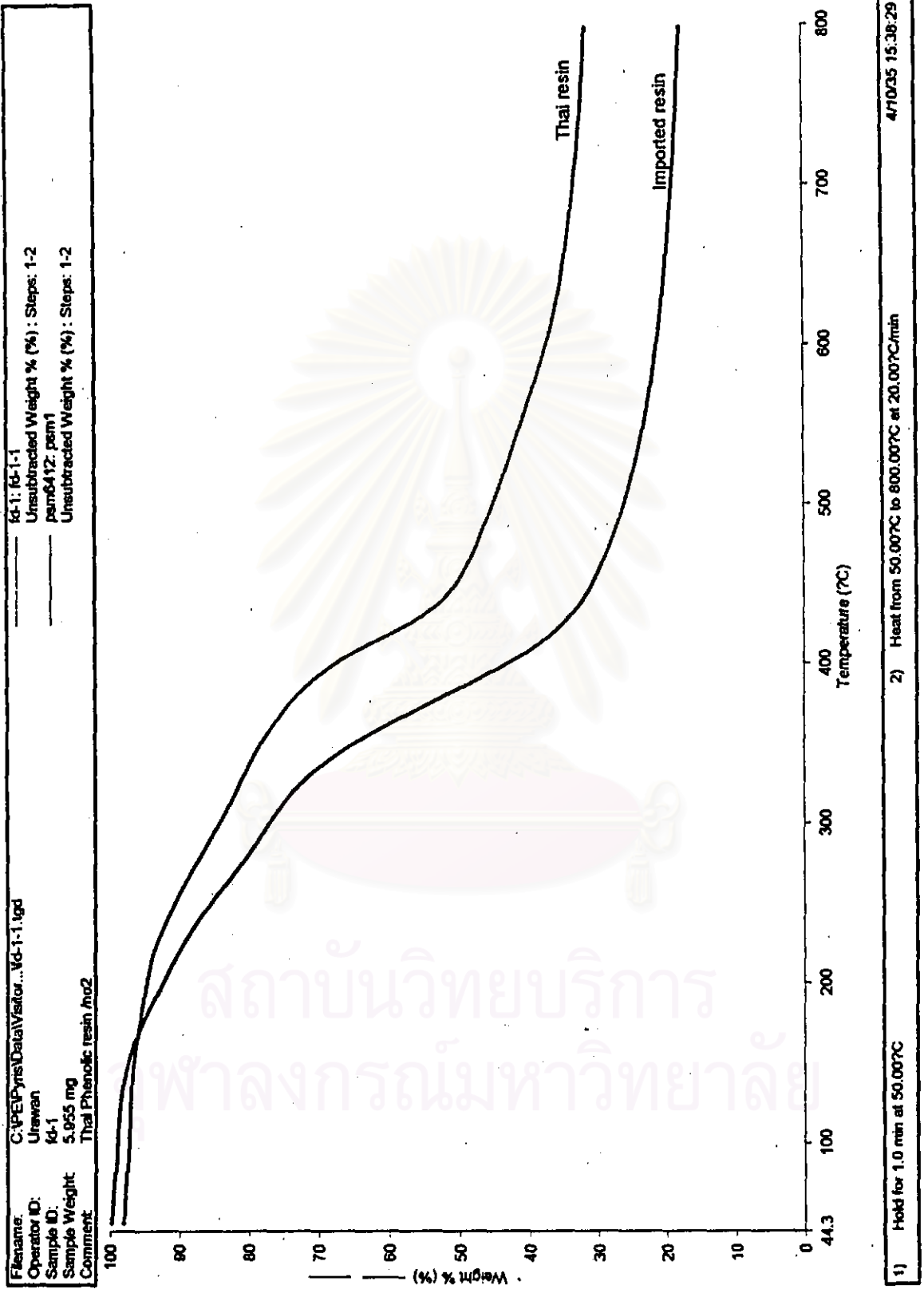


Figure B-1 TGA thermogram of Thai and imported resins

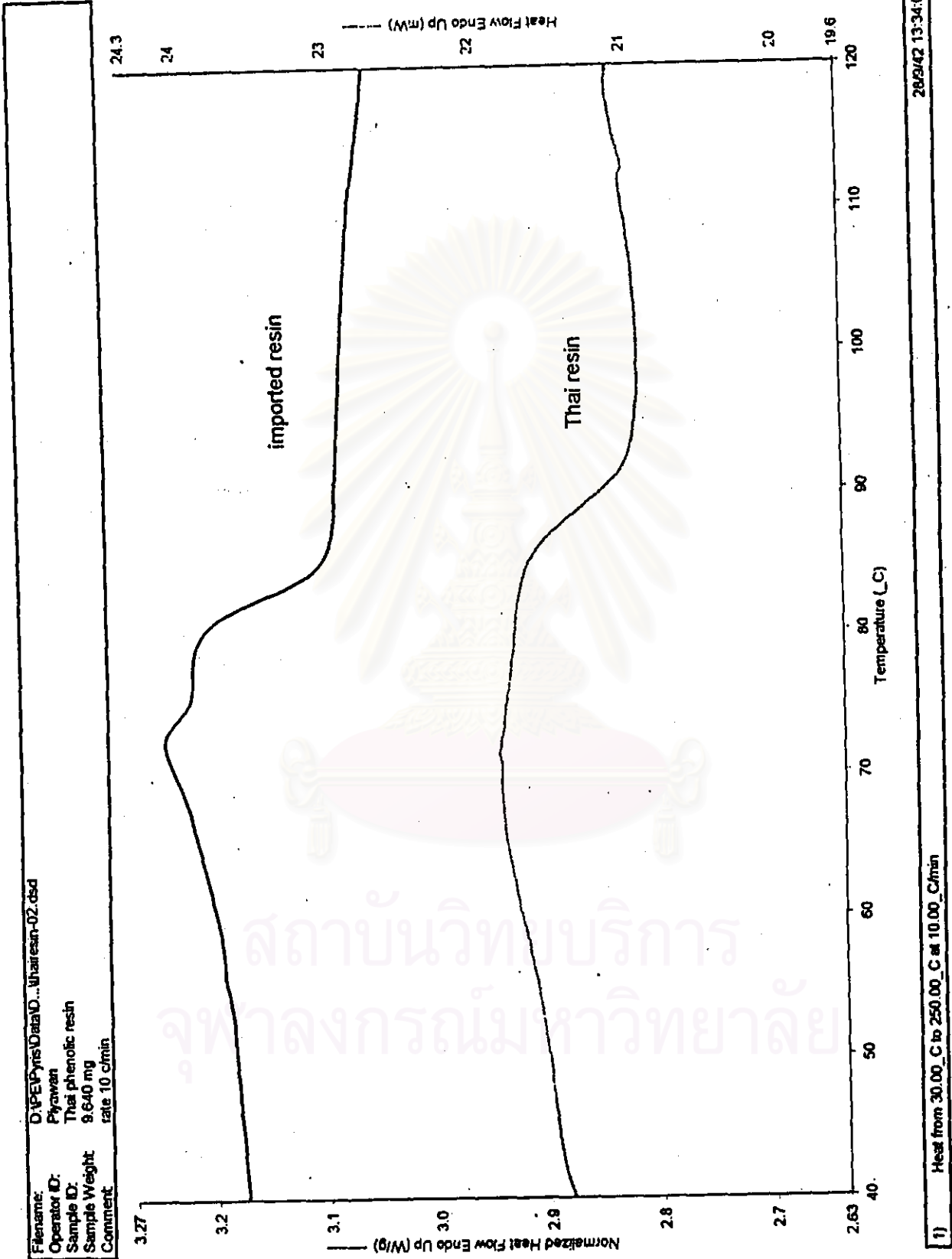


Figure B-2 DSC thermogram of Thai and imported resins

CURRICULUM VITAE

Miss Urawan Oengaew was born in April, 30, 1959 in Pitsanuloke. She received a Bachelor of Science degree with a major in Chemistry from Ramkhamhang University in 1980. She started as graduate student in Department of Materials Science with a major in Applied Polymer Science and Textile Technology, Chulalongkorn University in June 1997, and completed the programme in October 1999.



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