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APPENDIX

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APPENDIX A

CHARGE PROPERTIES AND SOME OF THEIR PRINT QUALITIES OF THE TONERS

PART I The q/m values of various toners evaluated by a blow off measurement unit; The maximum density, the background density, and the dot gain percentages of the printed sheets evaluated by a reflection densitometer.

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Table A-1 q/m values of various toners and F-200 carrier by a rotating roller, at 53 ± 3 %RH and 21 ± 2 °C

Carrier Types	Toners	q/m values (-microC/g) at rotating times (min.)								
		1	2	3	5	10	20	40	60	90
F-200	KT-04b	4.450	5.026	5.373	4.889	5.271	5.081	5.384	6.559	7.500
	KT-05b	3.923	5.772	6.000	5.927	6.930	6.483	6.483	7.605	8.182
	KT-06b	4.320	5.723	7.228	8.155	7.742	7.840	9.191	10.144	10.565
	KT-07b	7.016	7.018	7.501	8.643	8.960	9.649	9.763	9.983	10.433
	KT-08b	2.937	3.379	3.448	3.595	3.659	3.844	4.477	4.776	5.707
	KT-09b	3.195	5.168	5.423	5.241	5.809	6.248	6.626	7.370	8.088
	KT-10b	3.434	3.147	3.403	3.440	3.199	2.997	3.279	4.007	4.405
	KT-11b	3.287	4.270	4.403	4.161	4.379	4.725	4.883	4.975	5.829
	KT-12b	2.928	4.294	4.905	5.165	4.878	5.097	5.909	5.798	6.357
	KT-13b	3.255	4.438	4.714	4.486	4.458	4.494	5.309	5.530	6.221
	KT-14b	2.903	5.149	5.529	6.558	6.209	6.179	6.114	6.401	7.657
	KT-15b	6.480	6.864	6.960	6.981	6.972	7.513	7.462	8.115	9.413
	KT-04a	3.637	4.240	4.691	5.303	6.259	7.282	8.192	9.197	9.722
	KT-05a	5.876	5.624	8.086	8.299	9.208	9.566	11.111	11.754	12.078

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Table A-2 q/m values of irregular shape toner, N-09C, and spherical shape toner, N-09S, and F-200 carrier, by a rotating roller, at 53 ± 3 %RH and 21 ± 2 °C

Carrier Types	Toners	q/m values (-microC/g) at rotating times (min.)										
		1	2	3	5	10	20	40	60	90	120	150
F-200	N-09C	21.089	23.686	23.598	22.974	21.141	21.254	19.665	19.785	18.287	17.234	16.471
	N-09S	17.199	20.901	21.942	23.859	21.075	20.256	20.520	21.253	22.889	23.195	23.500

Table A-3 q/m values of toners, KT-04b to KT-07b, and carriers, A-3 and Iron Shot, by a rotating roller, at 53±3 %RH and 21±2 °C

Carrier Types	Toners	q/m values (-microC/g) at rotating times (min.)								
		1	2	3	5	10	20	40	60	90
A-3	KT-04b	9.290	10.588	12.000	11.586	14.182	13.000	11.077	11.143	12.218
	KT-05b	12.000	12.000	17.684	16.421	12.440	13.714	14.400	13.895	14.400
	KT-06b	7.610	14.727	12.000	17.937	15.000	14.817	15.529	14.609	15.168
	KT-07b	6.347	13.248	12.923	14.609	15.411	15.000	13.600	13.385	12.185
Iron Shot	KT-04b	4.525	4.650	4.895	5.483	5.691	5.831	5.495	5.071	5.012
	KT-05b	4.800	4.737	5.429	5.419	6.737	6.947	5.829	5.922	6.000
	KT-06b	3.909	4.963	5.440	6.320	6.525	6.795	6.340	6.216	6.119
	KT-07b	4.024	4.634	4.757	6.439	6.529	6.159	6.760	5.774	5.534

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Table A-4 q/m values of toners, KT-04a , KT-05a, KT-04b, and KT-05b, and F-200 carrier, by a rotating roller, at 29±3 %RH and 21±2 °C

Carrier Types	Toners	q/m values (-microC/g) at rotating times (min.)								
		1	2	3	5	10	20	40	60	90
F-200	KT-04a	2.980	4.022	4.490	4.730	5.379	5.764	6.870	7.170	7.530
	KT-05a	1.959	6.110	7.820	9.630	10.600	12.220	13.500	15.060	15.020
	KT-04b	2.980	4.022	4.490	4.730	5.379	5.764	6.870	7.170	7.530
	KT-05b	4.800	6.680	6.430	7.670	8.090	8.880	9.700	11.020	11.520

Table A-5 q/m values of various toners by a developing roller (no carrier), and a hand shaking (with F-200 carrier), for 1 minute, at 53±3 %RH and 21±2 °C

Toners	q/m values (-microC/g)	
	A developing roller (no carrier)	A hand shaking (with F-200 carrier)
KT-04b	5.773	8.592
KT-05b	12.976	11.048
KT-06b	14.325	11.094
KT-07b	14.822	11.490
KT-08b	4.805	6.557
KT-09b	8.146	10.978
KT-10b	6.311	9.185
KT-11b	4.880	9.161
KT-12b	4.905	8.579
KT-13b	8.620	7.812
KT-14b	10.936	8.813
KT-15b	15.214	8.531
N-09C	22.481	19.139
N-09S	24.622	27.179

Table A-6 Solid density and background density of various toners by printing with OKI 400 micro line CL

	KT-04b	KT-05b	KT-06b	KT-07b	KT-08b	KT-09b	KT-10b	KT-11b	KT-12b	KT-13b	KT-14b	KT-15b	N-09C	N-09S
Solid density	1.32	1.46	1.49	1.52	1.36	1.38	1.29	1.01	1.11	1.36	1.44	1.46	1.48	1.36
Background density	0.02	0	0	0	0.01	0	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03

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Table A-7 Dot area percentages of various toners by printing with OKI 400 micro line CL

% Dot (original)	KT-04b		KT-05b		KT-06b		KT-07b		KT-08b		KT-09b		KT-10b	
	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain
0	1	1	0	0	0	0	1	1	1	1	0	0	0	0
10	13	3	14	4	14	4	14	4	13	3	14	4	12	2
20	28	8	29	9	29	9	29	9	27	7	29	9	27	7
30	42	12	46	16	45	15	46	16	44	14	46	16	44	14
40	61	21	63	28	65	25	66	26	64	24	68	28	63	23
60	77	17	86	26	81	21	81	21	79	19	86	26	78	18
80	85	5	92	12	89	9	90	10	88	8	92	12	88	8
100	92	-8	99	-1	98	-2	100	0	97	-3	98	-2	94	-6

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Table A-7 Dot area percentages of various toners by printing with OKI 400 micro line CL (continued)

% Dot (original)	KT-11b		KT-12b		KT-13b		KT-14b		KT-15b		N-09C		N-09S	
	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain	% Dot (print)	% Dot gain
0	0	0	0	0	0	0	0	0	0	0	1	1	2	2
10	12	2	12	2	13	3	12	2	13	3	13	3	16	6
20	27	7	27	7	29	9	28	8	30	10	26	6	31	11
30	42	12	41	11	45	15	44	14	46	16	41	11	47	17
40	63	23	61	21	64	24	64	24	65	25	60	20	66	26
60	76	16	75	15	79	19	81	21	81	21	79	19	80	20
80	78	-2	80	0	86	6	90	10	90	10	88	8	89	9
100	83	-17	87	-13	96	-4	99	-1	99	-1	100	0	96	-4

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PART II The q/m values of various toners evaluated by E-SPART analyzer. The toners are the following: KT-04b, KT-05b, KT-07b, KT-10b, KT-14b, N-09C, and N-09S.



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KT-04b + F-200

date : 97/05/29
 data file name : 29-1C
 sample name :
 measuring time (sec) = 98.75
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -5.19728
 max particle charge (pos) (femt C) = 17.8606

No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	0	0.00(0.000)	0	0.00(0.000)	0	0.00
2	2.2	4	-1.31(0.476)	1	1.45(0.524)	5	0.13
3	2.5	1	-0.46(0.130)	2	3.05(0.870)	3	2.60
4	2.9	6	-2.74(1.000)	0	0.00(0.000)	6	-2.74
5	3.3	14	-6.47(0.604)	2	4.23(0.396)	16	-2.24
6	3.7	14	-7.83(0.961)	1	0.32(0.039)	15	-7.51
7	4.2	24	-15.01(0.997)	1	0.05(0.003)	25	-14.96
8	4.7	71	-51.27(1.000)	0	0.00(0.000)	71	-51.27
9	5.3	104	-91.44(0.937)	4	6.11(0.063)	108	-85.33
10	6.0	208	-217.25(0.909)	7	21.74(0.091)	215	-195.51
11	6.7	296	-325.79(0.958)	7	14.33(0.042)	303	-311.46
12	7.5	353	-485.70(0.930)	5	36.30(0.070)	358	-449.39
13	8.4	370	-567.74(0.992)	3	4.75(0.008)	373	-562.99
14	9.3	197	-344.99(0.961)	1	14.08(0.039)	198	-330.91
15	10.5	59	-124.07(1.000)	0	0.00(0.000)	59	-124.07
16	11.8	17	-37.97(1.000)	0	0.00(0.000)	17	-37.97
17	13.3	4	-9.47(0.392)	3	14.72(0.608)	7	5.24
18	14.9	0	0.00(0.000)	0	0.00(0.000)	0	0.00
19	16.7	1	-4.48(0.525)	1	4.05(0.475)	2	-0.43
20	18.8	1	-4.57(1.000)	0	0.00(0.000)	1	-4.57
21	21.3	3	-9.54(1.000)	0	0.00(0.000)	3	-9.54
22	24.2	0	0.00(0.000)	0	0.00(0.000)	0	0.00

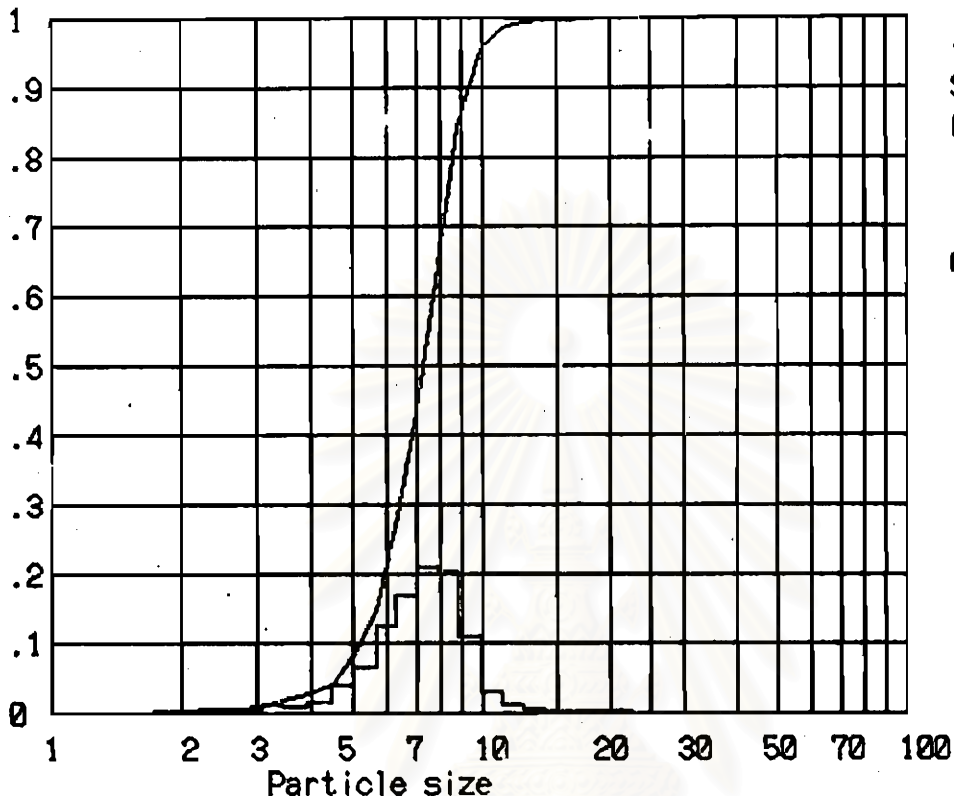
average diameter : d50 (count) = 7.32(μm) d50 (volume) = 8.35(μm)

	negative	positive	total
count (-)	1747 (0.979)	38 (0.021)	1785
mass (nano gram)	432.7 (0.976)	10.8 (0.024)	443.5
charge (femt C)	-2308.09 (0.949)	125.19 (0.051)	-2182.90
q/m (micro C/g)	-5.33	11.55	-4.92

KT-04b + F-200

Number fraction (-)

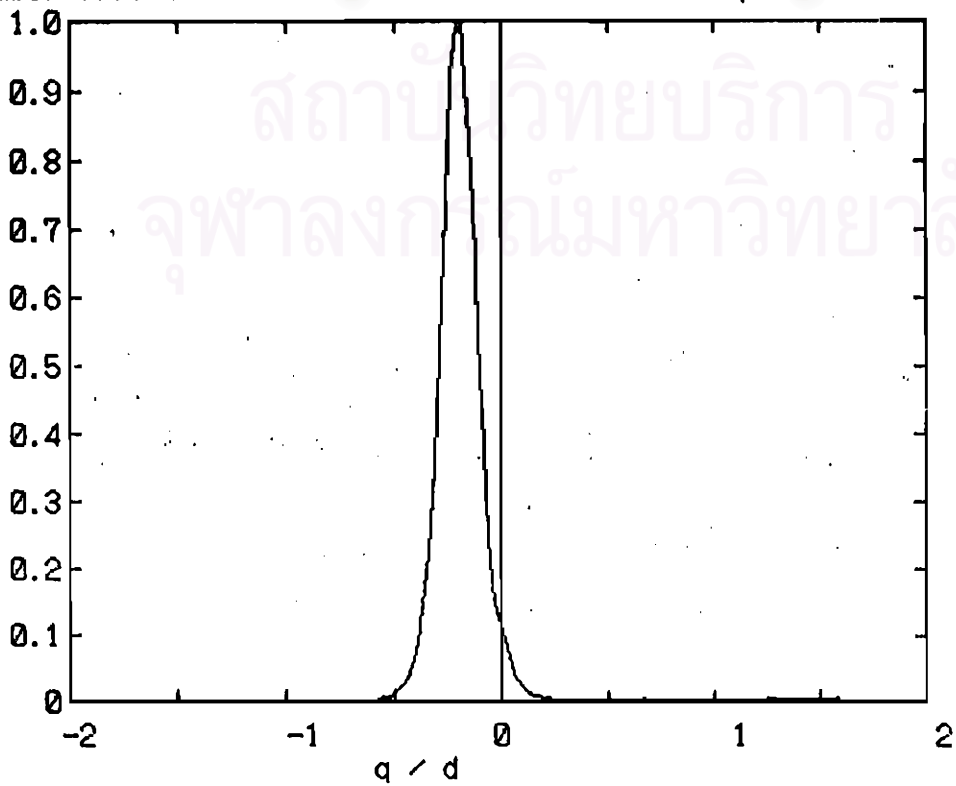
***** SIZE DISTRIBUTION (number base) *****



Number fraction

(-)

***** q/d distribution *****



KT-04b + F-200

date : 97/05/29
 data file name : 29-2C
 sample name :
 measuring time (sec) = 99.25
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -9.97216
 max particle charge (pos) (femt C) = 36.9214

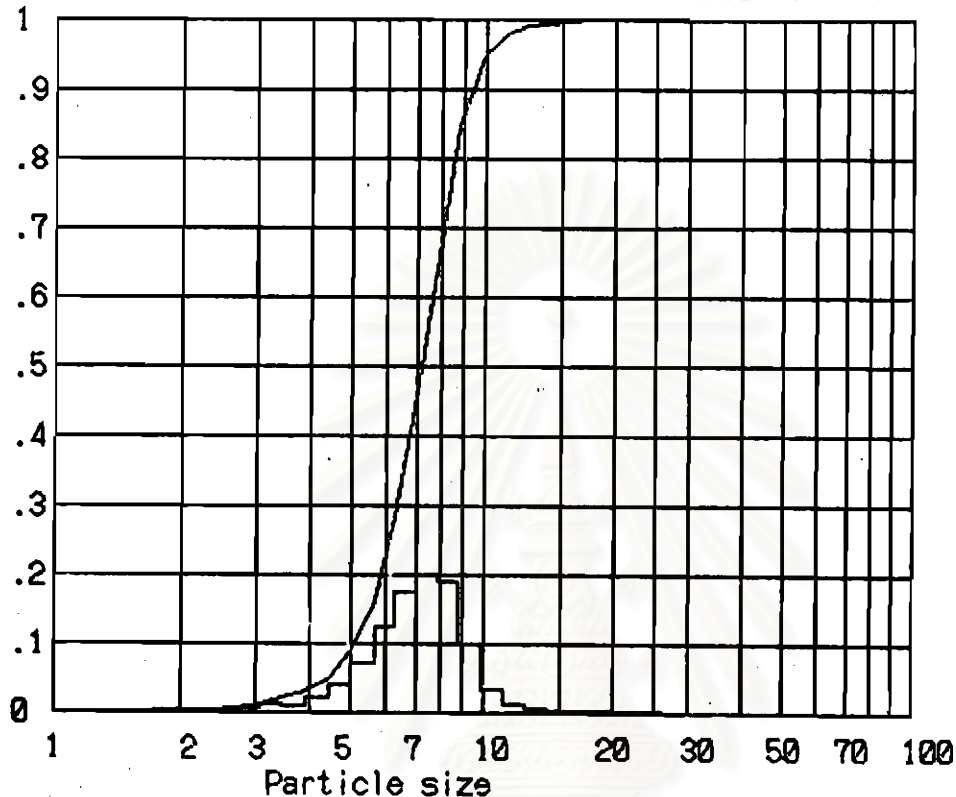
No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	2	-0.53(1.000)	0	0.00(0.000)	2	-0.53
2	2.2	2	-0.58(1.000)	0	0.00(0.000)	2	-0.58
3	2.5	4	-1.28(1.000)	0	0.00(0.000)	4	-1.28
4	2.9	5	-3.06(0.394)	2	4.71(0.606)	7	1.65
5	3.3	15	-6.67(0.714)	3	2.68(0.286)	18	-3.99
6	3.7	14	-6.64(1.000)	0	0.00(0.000)	14	-6.64
7	4.2	28	-17.81(1.000)	0	0.00(0.000)	28	-17.81
8	4.7	63	-45.63(0.948)	1	2.53(0.052)	64	-43.10
9	5.3	118	-93.43(0.996)	3	0.33(0.004)	121	-93.10
10	6.0	212	-201.71(0.980)	1	4.11(0.020)	213	-197.60
11	6.7	305	-355.71(0.962)	8	14.08(0.038)	313	-341.63
12	7.5	356	-495.41(0.976)	3	11.98(0.024)	359	-483.43
13	8.4	330	-523.17(0.959)	5	22.49(0.041)	335	-500.68
14	9.3	164	-308.19(0.948)	3	16.93(0.052)	167	-291.26
15	10.5	56	-120.73(0.813)	3	27.85(0.187)	59	-92.88
16	11.8	14	-30.32(0.922)	1	2.55(0.078)	15	-27.77
17	13.3	6	-14.55(0.677)	1	6.94(0.323)	7	-7.61
18	14.9	3	-10.86(1.000)	0	0.00(0.000)	3	-10.86
19	16.7	4	-17.05(0.385)	2	27.28(0.615)	6	10.23
20	18.8	2	-8.66(1.000)	0	0.00(0.000)	2	-8.66
21	21.3	1	-2.45(1.000)	0	0.00(0.000)	1	-2.45
22	24.2	1	-4.03(0.098)	1	36.92(0.902)	2	32.89

average diameter : d50 (count) = 7.23(μm) d50 (volume) = 8.41(μm)

	negative	positive	total
count (-)	1705 (0.979)	37 (0.021)	1742
mass (nano gram)	421.1 (0.952)	21.4 (0.048)	442.5
charge (femt C)	-2268.47 (0.926)	181.37 (0.074)	-2087.10
q/m (micro C/g)	-5.39	8.48	-4.72

KT-04b + F-200

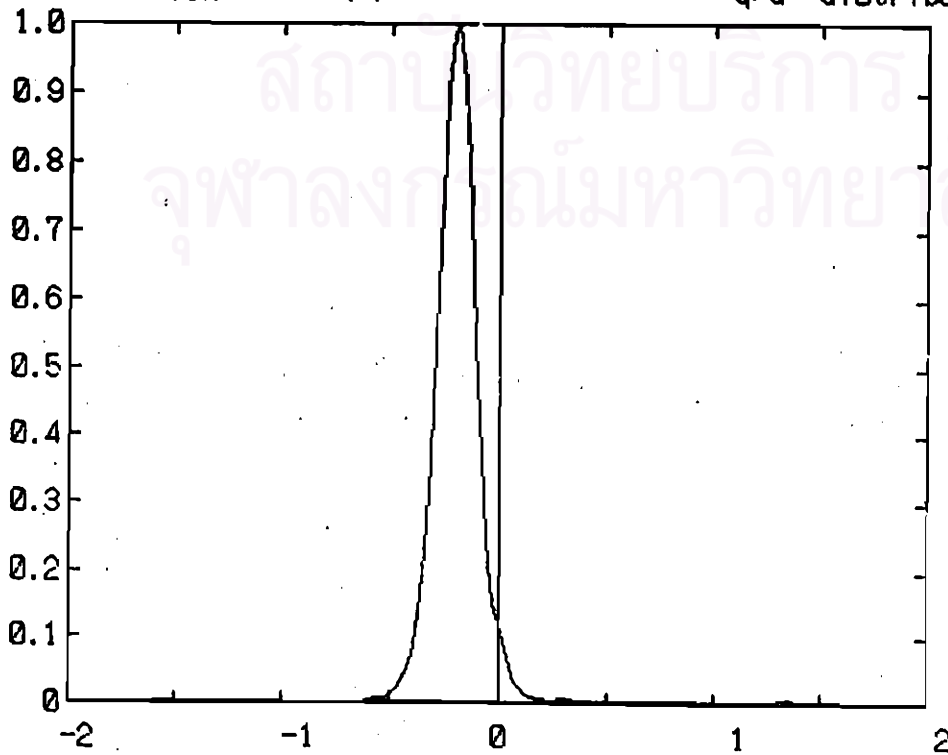
Number fraction (-) ***** SIZE DISTRIBUTION (number base) *****



file : 29-2
 Sample:
 p.density: 1.00

Average size
 $d_{50c} = 7.2 \mu\text{m}$
 $d_{50v} = 8.4 \mu\text{m}$

Number fraction (-) ***** q/d distribution *****



file : 29-2
 sample:
 field : 100 U
 p.density : 1.00 g/cc
 $q/m : -4.72 \mu\text{C/g}$

KT-05b + F-200

date : 97/05/29
 data file name : 29-3C
 sample name :
 measuring time (sec) = 91.75
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

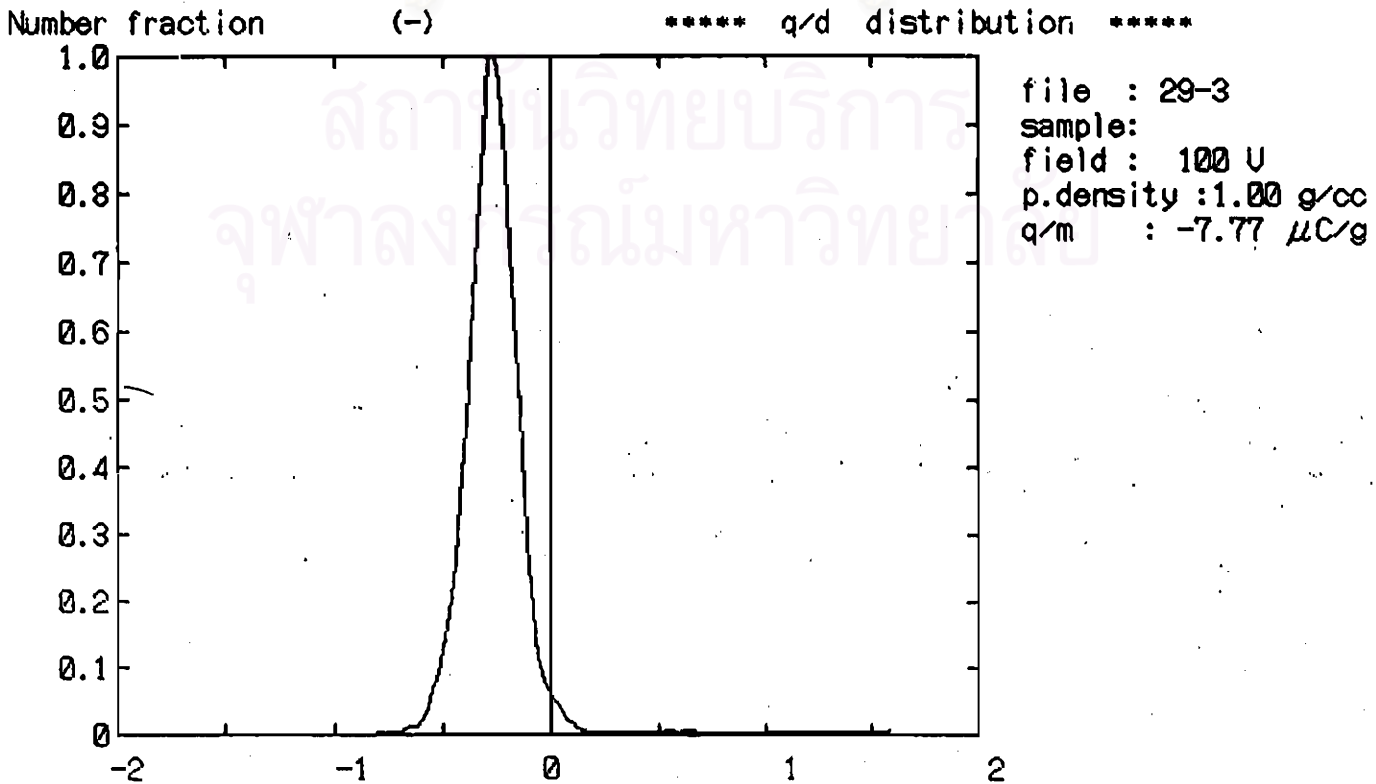
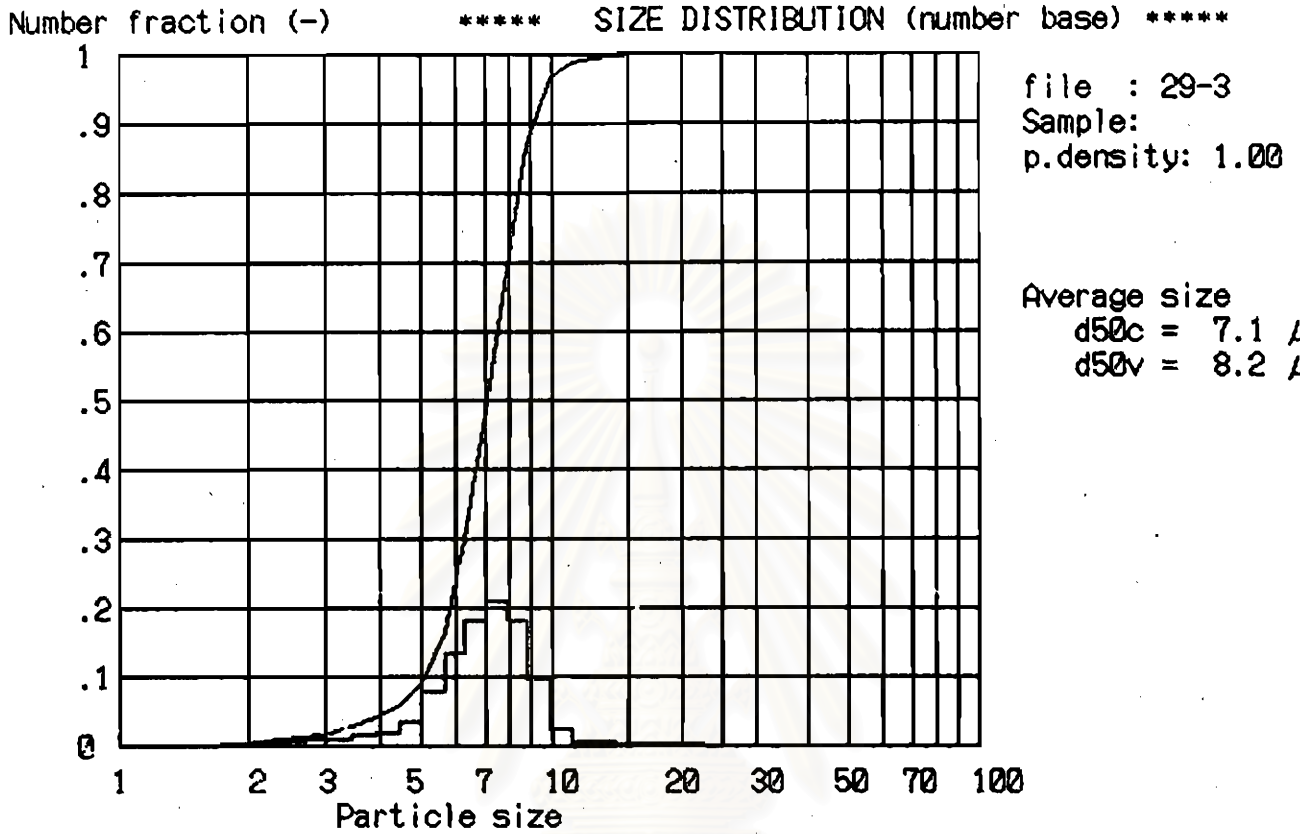
max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -8.37712
 max particle charge (pos) (femt C) = 20.7877

No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	4	-0.58(1.000)	0	0.00(0.000)	4	-0.58
2	2.2	6	-2.00(1.000)	0	0.00(0.000)	6	-2.00
3	2.5	5	-2.05(0.944)	2	0.12(0.056)	7	-1.92
4	2.9	9	-3.69(0.808)	1	0.88(0.192)	10	-2.81
5	3.3	11	-7.15(1.000)	0	0.00(0.000)	11	-7.15
6	3.7	22	-15.02(0.991)	1	0.14(0.009)	23	-14.88
7	4.2	27	-23.45(0.985)	1	0.36(0.015)	28	-23.09
8	4.7	55	-52.21(0.878)	1	7.22(0.122)	56	-44.98
9	5.3	141	-171.39(1.000)	1	0.07(0.000)	142	-171.32
10	6.0	236	-325.13(0.989)	4	3.74(0.011)	240	-321.39
11	6.7	323	-522.80(0.966)	4	18.44(0.034)	327	-504.37
12	7.5	389	-732.00(0.980)	4	15.28(0.020)	393	-716.73
13	8.4	331	-771.04(0.993)	2	5.28(0.007)	333	-765.76
14	9.3	175	-478.98(0.959)	3	20.24(0.041)	178	-458.74
15	10.5	41	-121.67(0.954)	2	5.86(0.046)	43	-115.81
16	11.8	8	-27.62(0.544)	2	23.11(0.456)	10	-4.50
17	13.3	6	-20.30(0.642)	1	11.33(0.358)	7	-8.97
18	14.9	4	-16.38(1.000)	0	0.00(0.000)	4	-16.38
19	16.7	0	0.00(0.000)	0	0.00(0.000)	0	0.00
20	18.8	1	-6.50(1.000)	0	0.00(0.000)	1	-6.50
21	21.3	0	0.00(0.000)	0	0.00(0.000)	0	0.00
22	24.2	0	0.00(0.000)	0	0.00(0.000)	0	0.00

average diameter : d50 (count) = 7.13(μm) d50 (volume) = 8.16(μm)

	negative		positive		total
count (-)	1794	(0.984)	29	(0.016)	1823
mass (nano gram)	402.1	(0.980)	8.2	(0.020)	410.3
charge (femt C)	-3299.94	(0.967)	112.07	(0.033)	-3187.87
q/m (micro C/g)	-8.21		13.65		-7.77

KT-05b + F-200



KT-05b + F-200

date : 97/05/29
 data file name : 29-4C
 sample name :
 measuring time (sec) = 104.5
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -12.1002
 max particle charge (pos) (femt C) = 17.0645

No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	1	-0.42(1.000)	0	0.00(0.000)	1	-0.42
2	2.2	1	-0.29(1.000)	0	0.00(0.000)	1	-0.29
3	2.5	2	-0.67(1.000)	0	0.00(0.000)	2	-0.67
4	2.9	8	-4.50(0.934)	1	0.32(0.066)	9	-4.18
5	3.3	12	-9.34(0.987)	1	0.12(0.013)	13	-9.22
6	3.7	16	-12.56(1.000)	0	0.00(0.000)	16	-12.56
7	4.2	38	-39.45(1.000)	0	0.00(0.000)	38	-39.45
8	4.7	68	-64.01(0.936)	3	4.40(0.064)	71	-59.61
9	5.3	137	-152.91(0.976)	1	3.79(0.024)	138	-149.12
10	6.0	273	-367.79(0.966)	5	12.92(0.034)	278	-354.86
11	6.7	325	-535.20(0.962)	5	20.87(0.038)	330	-514.34
12	7.5	340	-652.70(0.980)	5	13.30(0.020)	345	-639.41
13	8.4	332	-755.73(1.000)	0	0.00(0.000)	332	-755.73
14	9.3	169	-429.98(0.993)	1	3.20(0.007)	170	-426.78
15	10.5	49	-154.45(0.942)	1	9.46(0.058)	50	-144.99
16	11.8	11	-40.07(0.829)	1	8.25(0.171)	12	-31.82
17	13.3	4	-20.64(1.000)	0	0.00(0.000)	4	-20.64
18	14.9	4	-17.14(1.000)	0	0.00(0.000)	4	-17.14
19	16.7	0	0.00(0.000)	0	0.00(0.000)	0	0.00
20	18.8	0	0.00(0.000)	0	0.00(0.000)	0	0.00
21	21.3	1	-10.63(1.000)	0	0.00(0.000)	1	-10.63
22	24.2	0	0.00(0.000)	0	0.00(0.000)	0	0.00

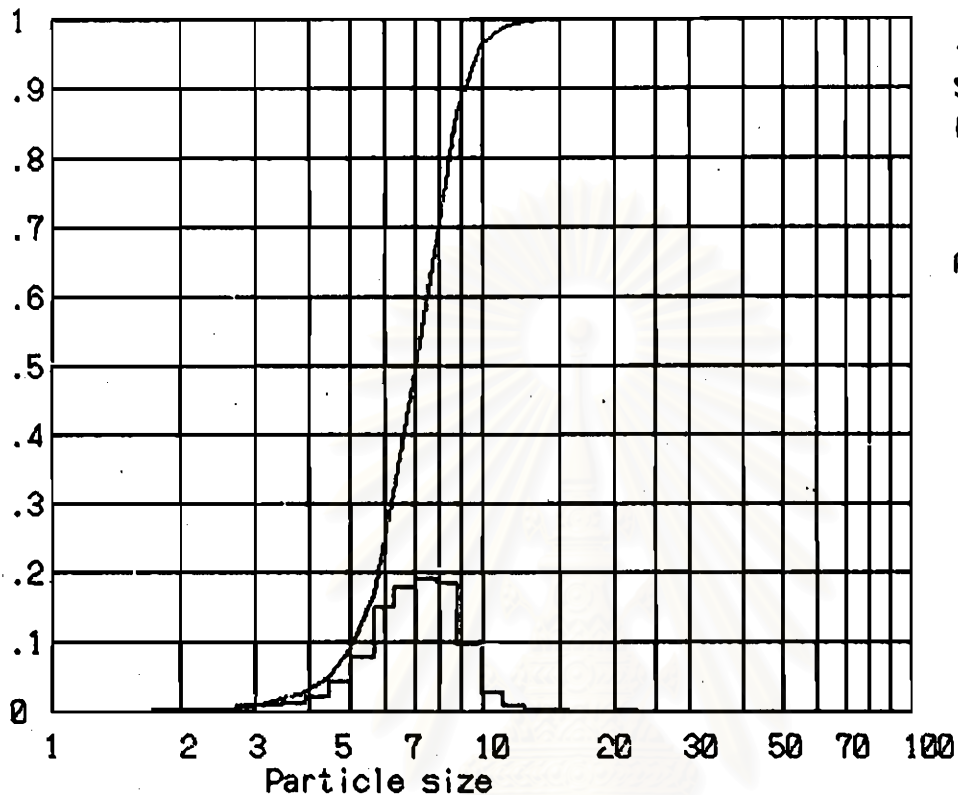
average diameter : d50 (count) = 7.09(μm) d50 (volume) = 8.18(μm)

	negative		positive		total
count (-)	1791	(0.987)	24	(0.013)	1815
mass (nano gram)	400.7	(0.989)	4.6	(0.011)	405.3
charge (femt C)	-3268.49	(0.977)	76.63	(0.023)	-3191.86
q/m (micro C/g)	-8.16		16.72		-7.88

KT-05b + F-200

Number fraction (-)

***** SIZE DISTRIBUTION (number base) *****



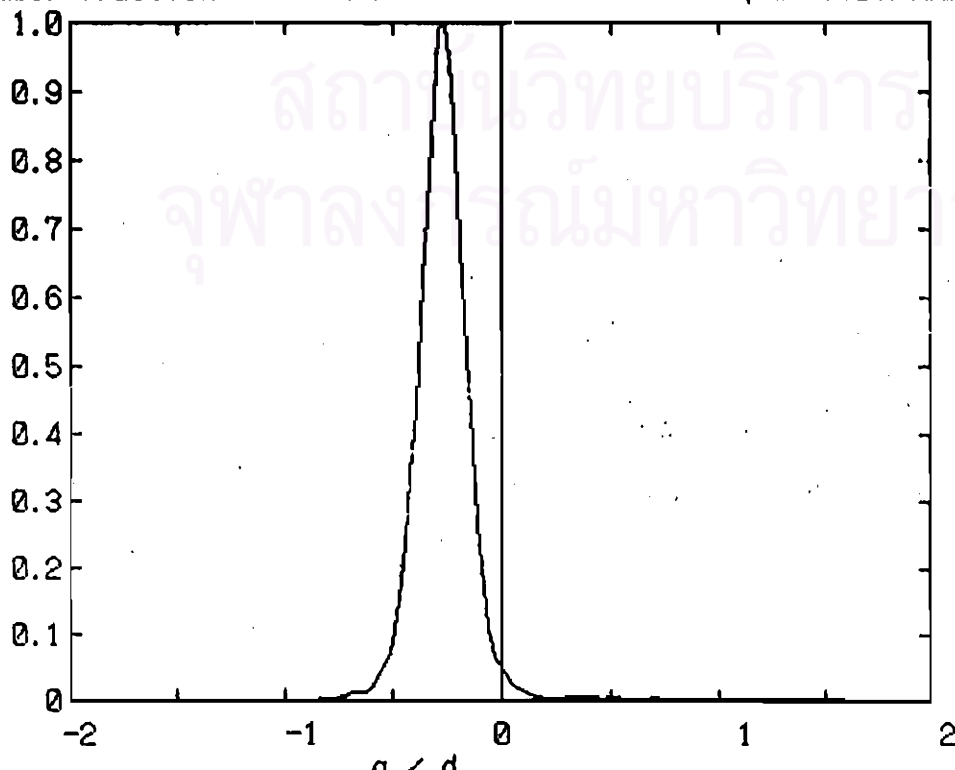
file : 29-4
 Sample:
 p.density: 1.00

Average size
 $d_{50c} = 7.1 \mu\text{m}$
 $d_{50v} = 8.2 \mu\text{m}$

Number fraction (-)

(-)

***** q/d distribution *****



file : 29-4
 sample:
 field : 100 V
 p.density : 1.00 g/cc
 $q/m : -7.88 \mu\text{C/g}$

KT-07b + F-200

date : 97/06/04
 data file name : 4-1C
 sample name :
 measuring time (sec) = 104.25
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -7.35632
 max particle charge (pos) (femt C) = 14.7923

No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	2	-0.40(0.783)	1	0.11(0.217)	3	-0.29
2	2.2	4	-1.37(0.464)	2	1.58(0.536)	6	0.21
3	2.5	5	-2.78(1.000)	0	0.00(0.000)	5	-2.78
4	2.9	13	-7.28(1.000)	0	0.00(0.000)	13	-7.28
5	3.3	18	-12.22(1.000)	0	0.00(0.000)	18	-12.22
6	3.7	21	-16.70(0.997)	1	0.05(0.003)	22	-16.65
7	4.2	41	-32.88(0.866)	2	5.07(0.134)	43	-27.80
8	4.7	83	-84.04(0.974)	4	2.23(0.026)	87	-81.80
9	5.3	149	-178.83(0.999)	3	0.20(0.001)	152	-178.63
10	6.0	298	-427.63(0.977)	5	10.24(0.023)	303	-417.39
11	6.7	362	-576.18(0.982)	2	10.73(0.018)	364	-565.45
12	7.5	346	-683.63(0.991)	3	6.32(0.009)	349	-677.31
13	8.4	254	-578.31(0.985)	1	8.55(0.015)	255	-569.75
14	9.3	124	-333.28(0.941)	3	20.71(0.059)	127	-312.57
15	10.5	48	-146.86(1.000)	0	0.00(0.000)	48	-146.86
16	11.8	14	-45.03(0.935)	1	3.15(0.065)	15	-41.87
17	13.3	5	-18.44(1.000)	0	0.00(0.000)	5	-18.44
18	14.9	0	0.00(0.000)	0	0.00(0.000)	0	0.00
19	16.7	0	0.00(0.000)	0	0.00(0.000)	0	0.00
20	18.8	2	-7.70(0.395)	1	11.79(0.605)	3	4.09
21	21.3	2	-10.35(0.927)	1	0.82(0.073)	3	-9.54
22	24.2	1	-4.65(1.000)	0	0.00(0.000)	1	-4.65

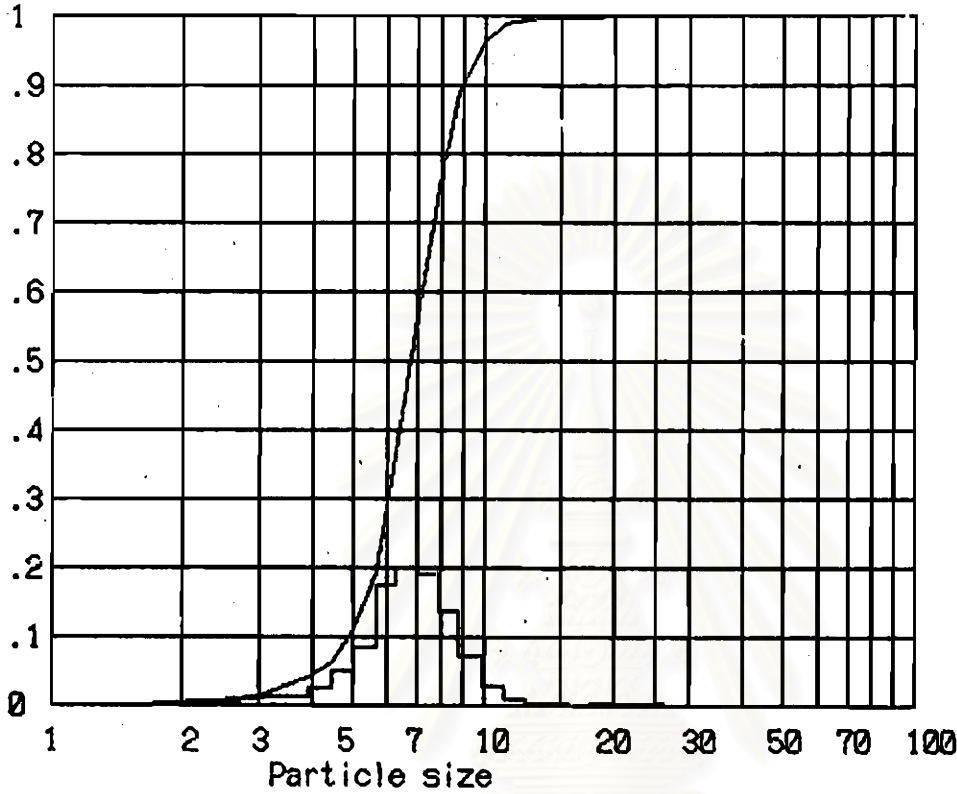
average diameter : d50 (count) = 6.80 (μm) d50 (volume) = 8.06 (μm)

	negative	positive	total
count (-)	1792 (0.984)	30 (0.016)	1822
mass (nano gram)	385.4 (0.967)	13.1 (0.033)	398.5
charge (femt C)	-3168.54 (0.975)	81.54 (0.025)	-3087.00
q/m (micro C/g)	-8.22	6.24	-7.75

KT-07b + F-200

Number fraction (-)

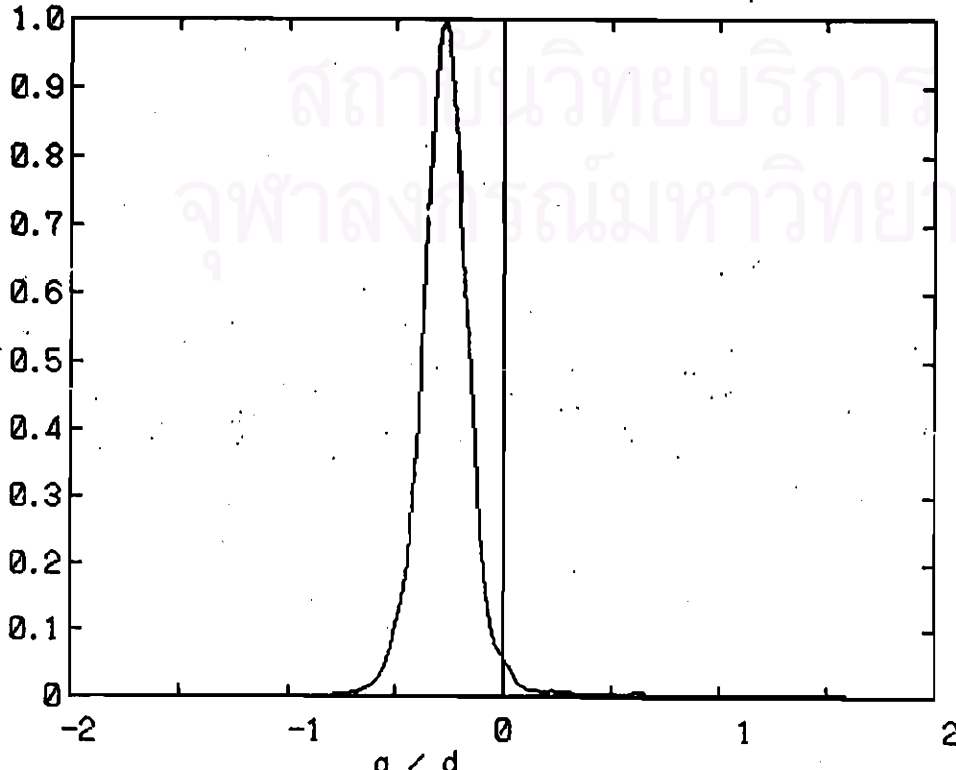
***** SIZE DISTRIBUTION (number base) *****



Number fraction (-)

(-)

***** q/d distribution *****



KT-07b + F-200

date : 97/06/04
 data file name : 4-2C
 sample name :
 measuring time (sec) = 111
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -7.65456
 max particle charge (pos) (femt C) = 29.475

No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	2	-0.71(1.000)	0	0.00(0.000)	2	-0.71
2	2.2	1	-0.50(0.135)	2	3.21(0.865)	3	2.71
3	2.5	2	-1.22(0.976)	1	0.03(0.024)	3	-1.19
4	2.9	7	-3.97(1.000)	0	0.00(0.000)	7	-3.97
5	3.3	18	-9.66(0.996)	1	0.04(0.004)	19	-9.62
6	3.7	25	-17.34(1.000)	0	0.00(0.000)	25	-17.34
7	4.2	47	-38.36(1.000)	0	0.00(0.000)	47	-38.36
8	4.7	76	-68.83(0.965)	4	2.47(0.035)	80	-66.36
9	5.3	169	-191.46(0.996)	3	0.73(0.004)	172	-190.73
10	6.0	310	-405.66(0.963)	7	15.76(0.037)	317	-389.90
11	6.7	374	-573.16(0.968)	9	19.02(0.032)	383	-554.14
12	7.5	353	-633.93(1.000)	0	0.00(0.000)	353	-633.93
13	8.4	241	-516.74(0.980)	4	10.56(0.020)	245	-506.18
14	9.3	123	-296.71(0.927)	4	23.43(0.073)	127	-273.28
15	10.5	37	-100.35(1.000)	0	0.00(0.000)	37	-100.35
16	11.8	16	-67.54(1.000)	0	0.00(0.000)	16	-67.54
17	13.3	1	-3.21(1.000)	0	0.00(0.000)	1	-3.21
18	14.9	5	-20.00(1.000)	0	0.00(0.000)	5	-20.00
19	16.7	0	0.00(0.000)	1	9.17(1.000)	1	9.17
20	18.8	1	-6.50(0.221)	1	22.86(0.779)	2	16.36
21	21.3	1	-7.36(1.000)	0	0.00(0.000)	1	-7.36
22	24.2	1	-3.41(1.000)	0	0.00(0.000)	1	-3.41

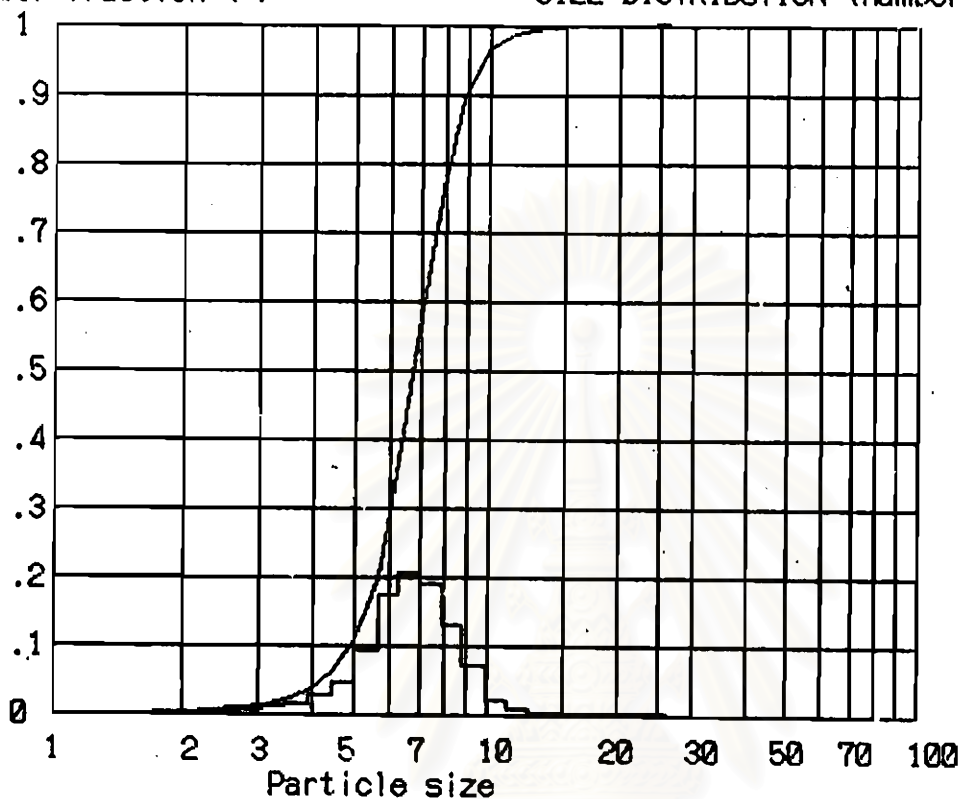
average diameter : d50 (count) = 6.76(μm) d50 (volume) = 7.97(μm)

	negative	positive	total
count (-)	1810 (0.980)	37 (0.020)	1847
mass (nano gram)	377.5 (0.970)	11.5 (0.030)	389.0
charge (femt C)	-2966.62 (0.965)	107.28 (0.035)	-2859.34
q/m (micro C/g)	-7.86	9.32	-7.35

KT-07b + F-200

Number fraction (-)

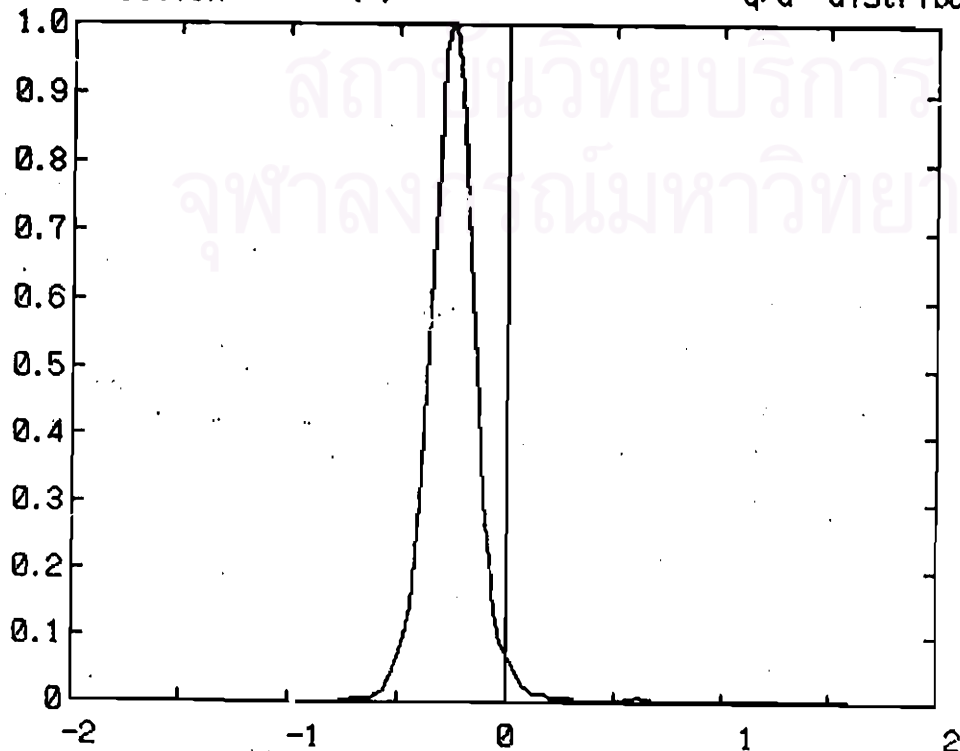
***** SIZE DISTRIBUTION (number base) *****



Number fraction

(-)

***** q/d distribution *****



file : 4-2

sample:

field : 100 U

p.density : 1.00 g/cc

q/m : -7.35 $\mu\text{C/g}$

KT-10b + F-200

date : 97/06/04
 data file name : 4-3C
 sample name :
 measuring time (sec) = 100.5
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -6.78784
 max particle charge (pos) (femt C) = 17.084

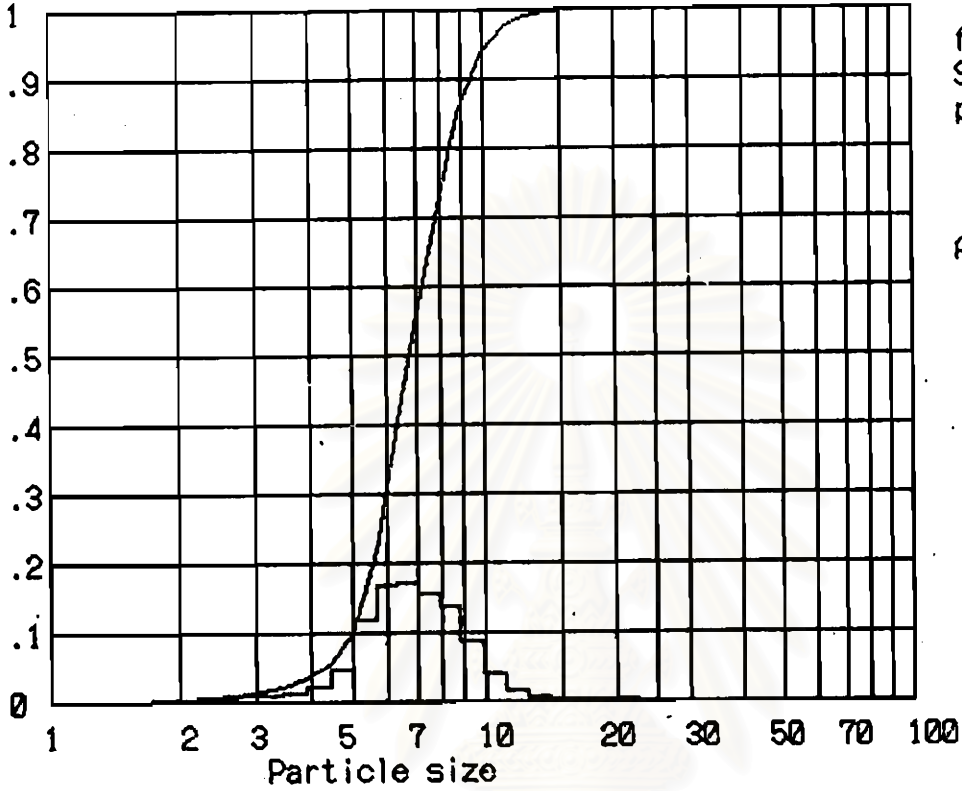
No.	ave. dia. (μm)	negative (-)	(femt C)	positive (-)	(femt C)	total (-)	(femt C)
1	1.9	1	-0.38(0.236)	1	1.23(0.764)	2	0.85
2	2.2	1	-0.71(1.000)	0	0.00(0.000)	1	-0.71
3	2.5	3	-1.13(1.000)	0	0.00(0.000)	3	-1.13
4	2.9	8	-3.66(1.000)	0	0.00(0.000)	8	-3.66
5	3.3	11	-5.87(0.456)	3	6.99(0.544)	14	1.12
6	3.7	16	-7.83(0.793)	3	2.05(0.207)	19	-5.78
7	4.2	28	-18.33(0.776)	6	5.28(0.224)	34	-13.05
8	4.7	77	-52.91(0.917)	4	4.82(0.083)	81	-48.09
9	5.3	201	-182.15(0.959)	4	7.84(0.041)	205	-174.31
10	6.0	286	-287.02(0.969)	3	9.19(0.031)	289	-277.83
11	6.7	304	-352.10(0.979)	4	7.71(0.021)	308	-344.40
12	7.5	271	-369.34(0.973)	4	10.37(0.027)	275	-358.97
13	8.4	245	-402.89(0.992)	2	3.38(0.008)	247	-399.51
14	9.3	153	-289.13(0.944)	3	17.16(0.056)	156	-271.97
15	10.5	64	-127.13(0.927)	3	9.99(0.073)	67	-117.14
16	11.8	26	-63.94(0.924)	3	5.25(0.076)	29	-58.68
17	13.3	6	-21.31(0.962)	1	0.85(0.038)	7	-20.47
18	14.9	4	-8.76(0.554)	1	7.05(0.446)	5	-1.71
19	16.7	2	-6.82(0.427)	1	9.17(0.573)	3	2.34
20	18.8	0	0.00(0.000)	1	17.08(1.000)	1	17.08
21	21.3	1	-4.09(0.500)	1	4.09(0.500)	2	0.00
22	24.2	0	0.00(0.000)	0	0.00(0.000)	0	0.00

average diameter : d50 (count) = 6.79(μm) d50 (volume) = 8.37(μm)

	negative	positive	total
count (-)	1708 (0.973)	48 (0.027)	1756
mass (nano gram)	384.9 (0.944)	23.0 (0.056)	407.8
charge (femt C)	-2205.49 (0.945)	129.49 (0.055)	-2076.01
q/m (micro C/g)	-5.73	5.64	-5.09

KT-10b + F-200

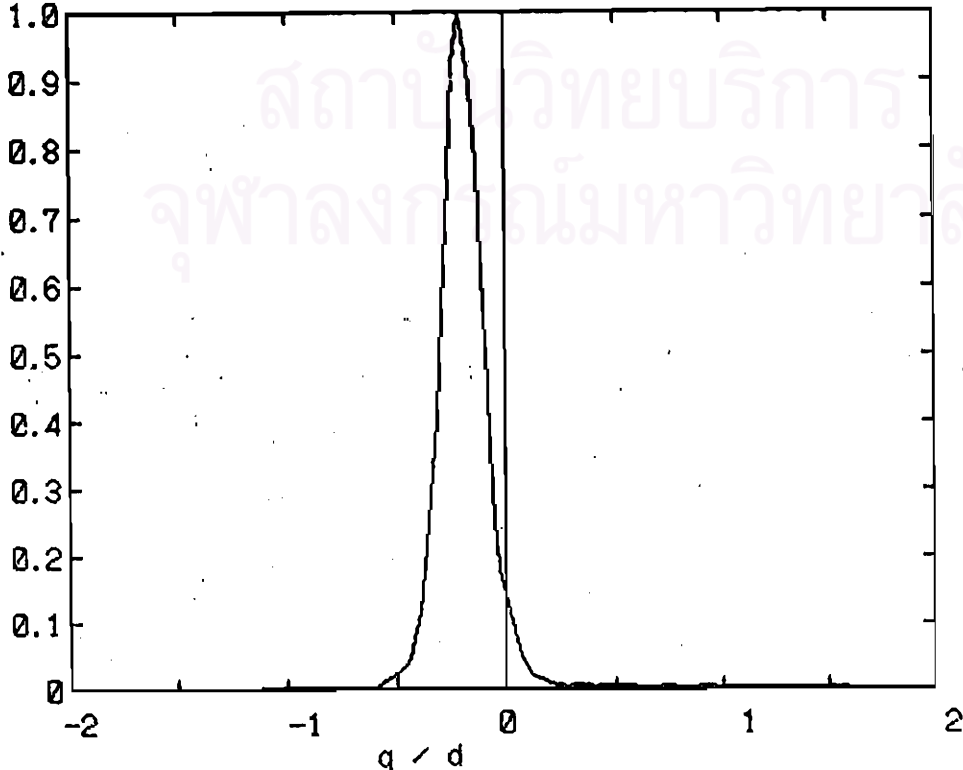
Number fraction (-) ***** SIZE DISTRIBUTION (number base) *****



file : 4-3
 Sample:
 p.density: 1.00

Average size
 d50c = 6.8 μm
 d50v = 8.4 μm

Number fraction (-) ***** q/d distribution *****



file : 4-3
 sample:
 field : 100 U
 p.density : 1.00 g/cc
 q/m : -5.09 $\mu\text{C/g}$

KT-10b + F-200

date : 97/06/04
 data file name : 4-4C
 sample name :
 measuring time (sec) = 97.75
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

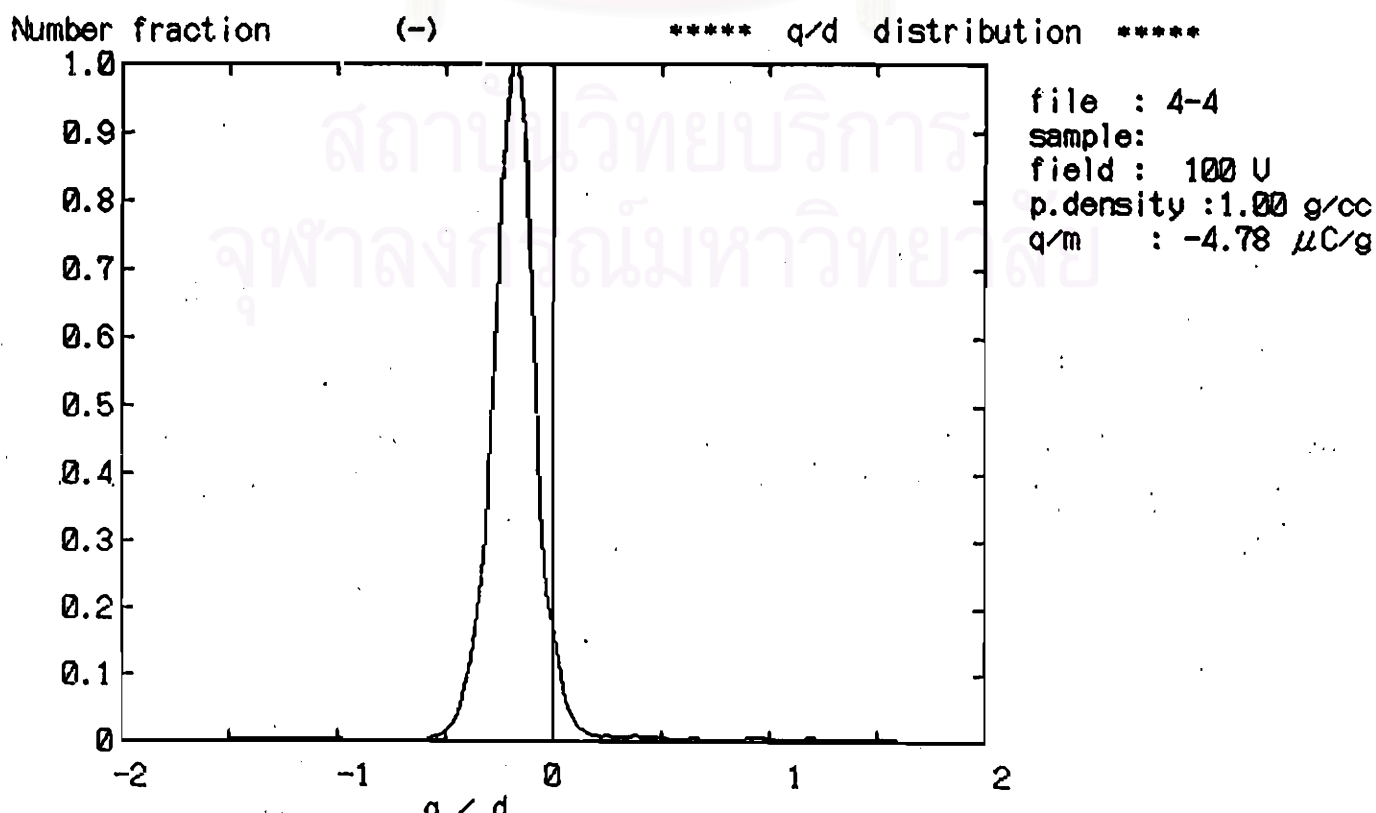
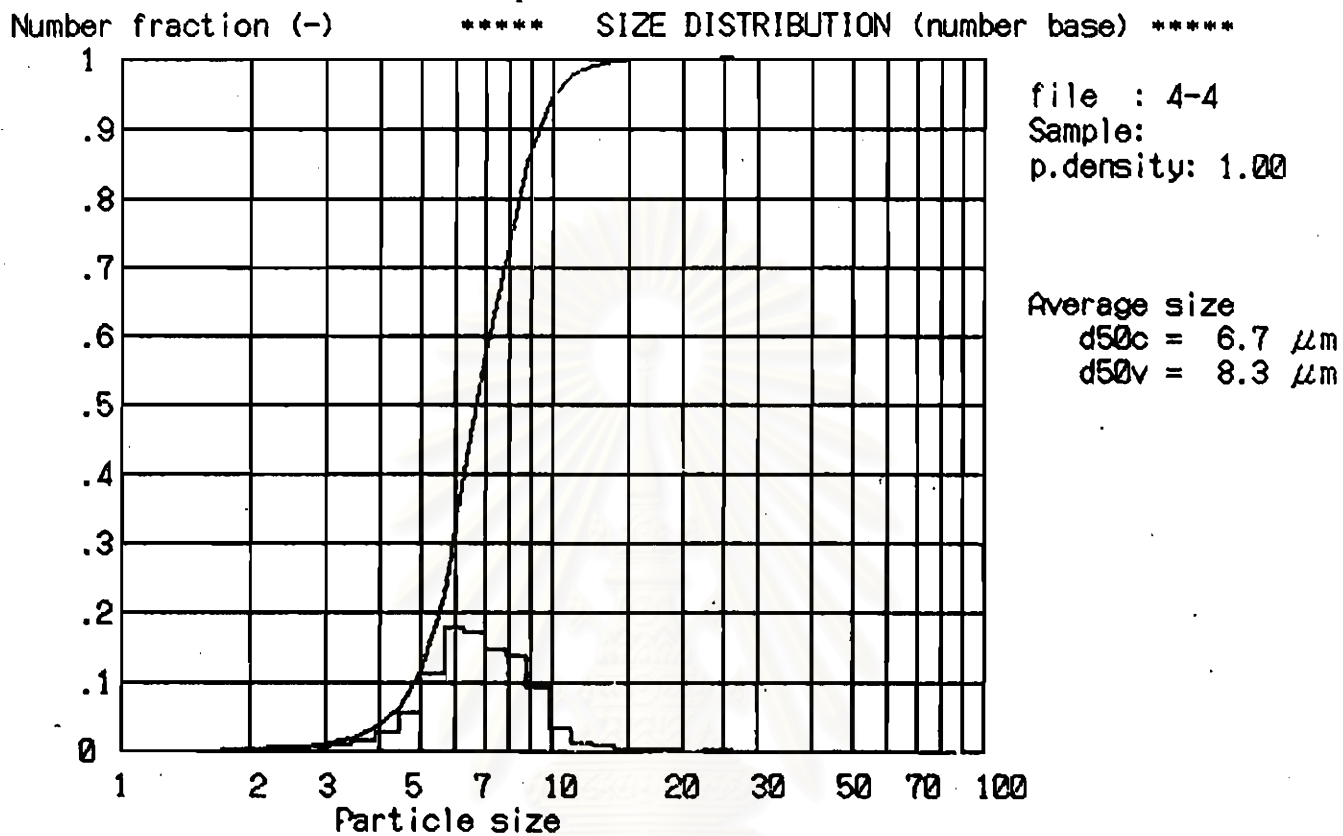
max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -10.8592
 max particle charge (pos) (femt C) = 16.444

No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	3	-0.60(0.964)	1	0.02(0.036)	4	-0.58
2	2.2	2	-0.58(1.000)	0	0.00(0.000)	2	-0.58
3	2.5	1	-0.15(1.000)	0	0.00(0.000)	1	-0.15
4	2.9	7	-3.62(1.000)	0	0.00(0.000)	7	-3.62
5	3.3	12	-7.35(0.727)	3	2.76(0.273)	15	-4.59
6	3.7	24	-12.10(0.993)	2	0.09(0.007)	26	-12.01
7	4.2	41	-23.87(0.939)	2	1.55(0.061)	43	-22.31
8	4.7	96	-67.41(0.980)	2	1.41(0.020)	98	-66.00
9	5.3	190	-160.42(0.972)	5	4.59(0.028)	195	-155.83
10	6.0	307	-280.97(0.925)	9	22.64(0.075)	316	-258.33
11	6.7	299	-332.24(0.967)	8	11.40(0.033)	307	-320.85
12	7.5	244	-312.67(0.957)	6	14.14(0.043)	250	-298.53
13	8.4	236	-347.44(0.900)	7	38.55(0.100)	243	-308.90
14	9.3	158	-260.85(0.939)	6	17.04(0.061)	164	-243.80
15	10.5	60	-127.13(1.000)	0	0.00(0.000)	60	-127.13
16	11.8	19	-46.38(0.997)	1	0.15(0.003)	20	-46.23
17	13.3	10	-24.36(0.583)	3	17.42(0.417)	13	-6.94
18	14.9	3	-10.86(1.000)	0	0.00(0.000)	3	-10.86
19	16.7	1	-2.34(1.000)	0	0.00(0.000)	1	-2.34
20	18.8	1	-4.57(0.264)	1	12.75(0.736)	2	8.18
21	21.3	0	0.00(0.000)	0	0.00(0.000)	0	0.00
22	24.2	1	-10.86(1.000)	0	0.00(0.000)	1	-10.86

average diameter : d50 (count) = 6.71(μm) d50 (volume) = 8.34(μm)

	negative		positive		total	
count (-)	1715	(0.968)	56	(0.032)	1771	
mass (nano gram)	379.0	(0.957)	17.0	(0.043)	395.9	
charge (femt C)	-2036.77	(0.934)	144.51	(0.066)	-1892.26	
q/m (micro C/g)	-5.37		8.52		-4.78	

KT-10b + F-200



KT-14b + F-200



date : 97/06/04
 data file name : 4-5-C
 sample name :
 measuring time (sec) = 96
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

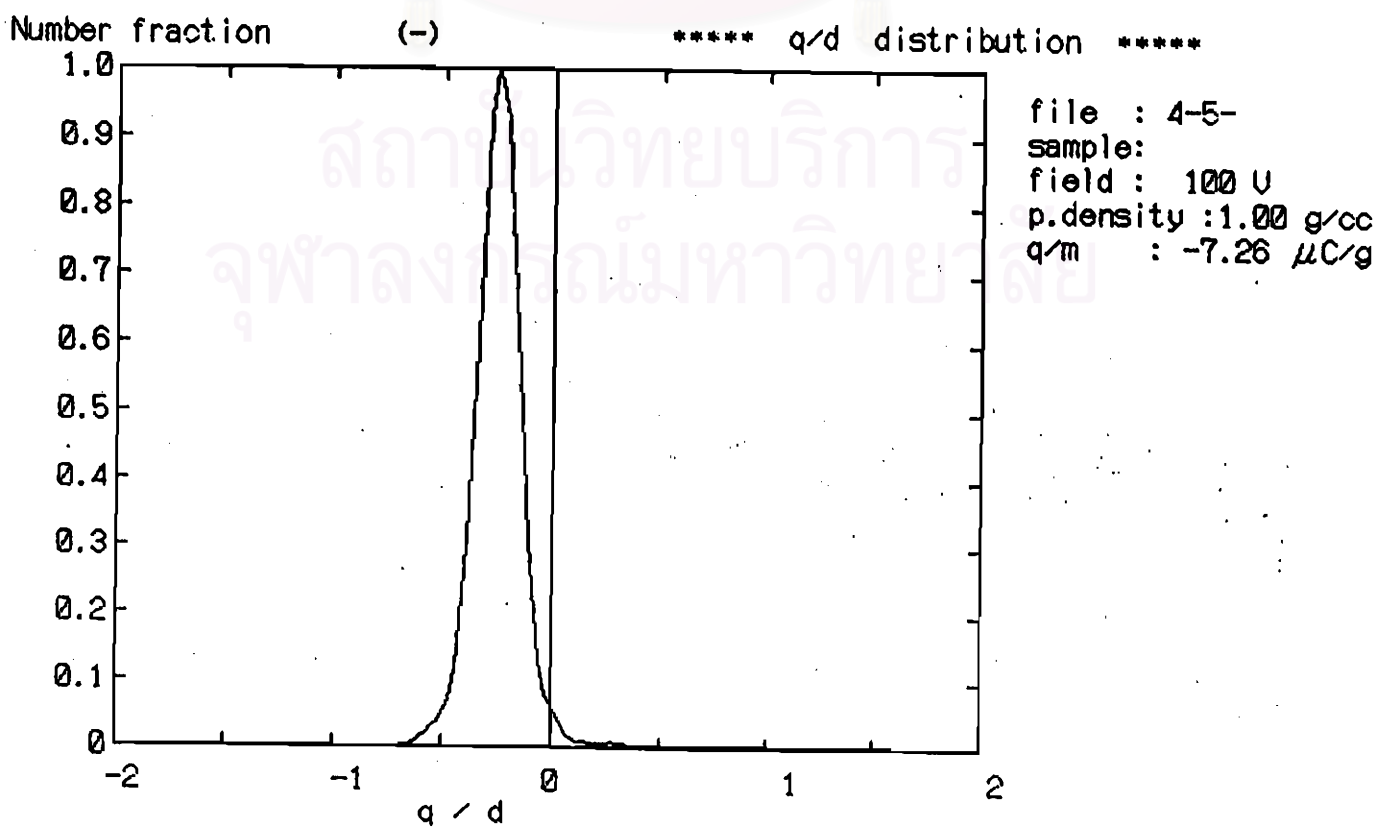
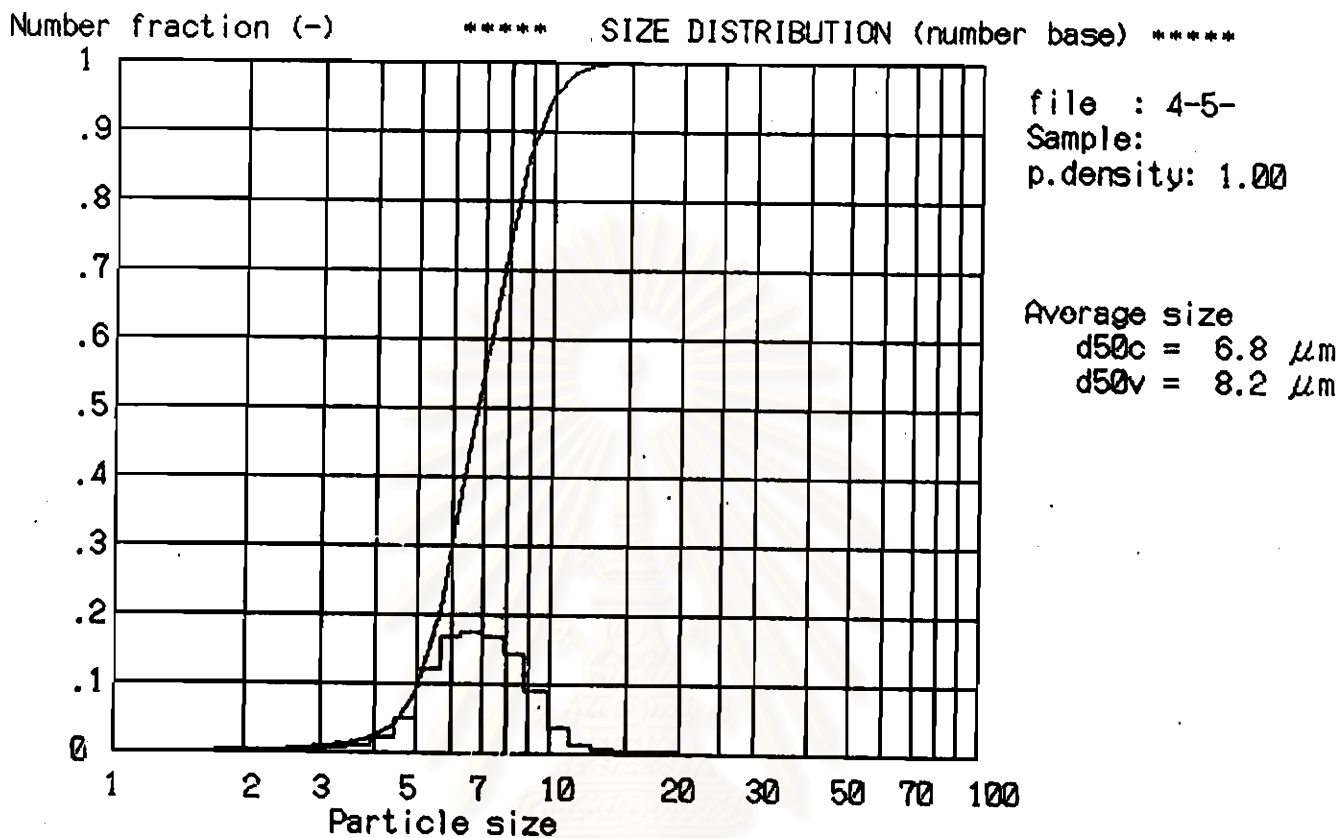
max charge range (femt C) = \pm 38.783
 max particle charge (neg) (femt C) = -6.51552
 max particle charge (pos) (femt C) = 11.7173

No.	ave. dia. (μ m)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	3	-1.18(1.000)	0	0.00(0.000)	3	-1.18
2	2.2	1	-0.66(0.658)	1	0.34(0.342)	2	-0.32
3	2.5	3	-1.13(1.000)	0	0.00(0.000)	3	-1.13
4	2.9	3	-1.72(1.000)	0	0.00(0.000)	3	-1.72
5	3.3	6	-3.59(1.000)	0	0.00(0.000)	6	-3.59
6	3.7	12	-7.74(1.000)	0	0.00(0.000)	12	-7.74
7	4.2	37	-32.88(0.879)	1	4.50(0.121)	38	-28.37
8	4.7	86	-79.63(0.902)	4	8.69(0.098)	90	-70.94
9	5.3	222	-241.76(0.993)	2	1.59(0.007)	224	-240.17
10	6.0	309	-399.16(0.984)	2	6.43(0.016)	311	-392.74
11	6.7	320	-465.73(0.992)	3	3.94(0.008)	323	-461.80
12	7.5	314	-550.30(0.999)	1	0.28(0.001)	315	-550.01
13	8.4	262	-541.56(0.954)	5	26.09(0.046)	267	-515.47
14	9.3	159	-394.47(0.950)	3	20.95(0.050)	162	-373.52
15	10.5	66	-180.44(0.985)	1	2.80(0.015)	67	-177.64
16	11.8	21	-70.09(1.000)	0	0.00(0.000)	21	-70.09
17	13.3	7	-19.45(1.000)	0	0.00(0.000)	7	-19.45
18	14.9	1	-3.24(0.447)	1	4.00(0.553)	2	0.76
19	16.7	0	0.00(0.000)	0	0.00(0.000)	0	0.00
20	18.8	1	-5.05(1.000)	0	0.00(0.000)	1	-5.05
21	21.3	0	0.00(0.000)	0	0.00(0.000)	0	0.00
22	24.2	0	0.00(0.000)	0	0.00(0.000)	0	0.00

average diameter : d50 (count) = 6.83(μ m) d50 (volume) = 8.18(μ m)

	negative	positive	total
count (-)	1833 (0.987)	24 (0.013)	1857
mass (nano gram)	395.7 (0.984)	6.5 (0.016)	402.2
charge (femt C)	-2999.78 (0.974)	79.61 (0.026)	-2920.17
q/m (micro C/g)	-7.58	12.30	-7.26

KT-14b + F-200



KT-14b + F-200

date : 97/06/04
 data file name : 4-6C
 sample name :
 measuring time (sec) = 104
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

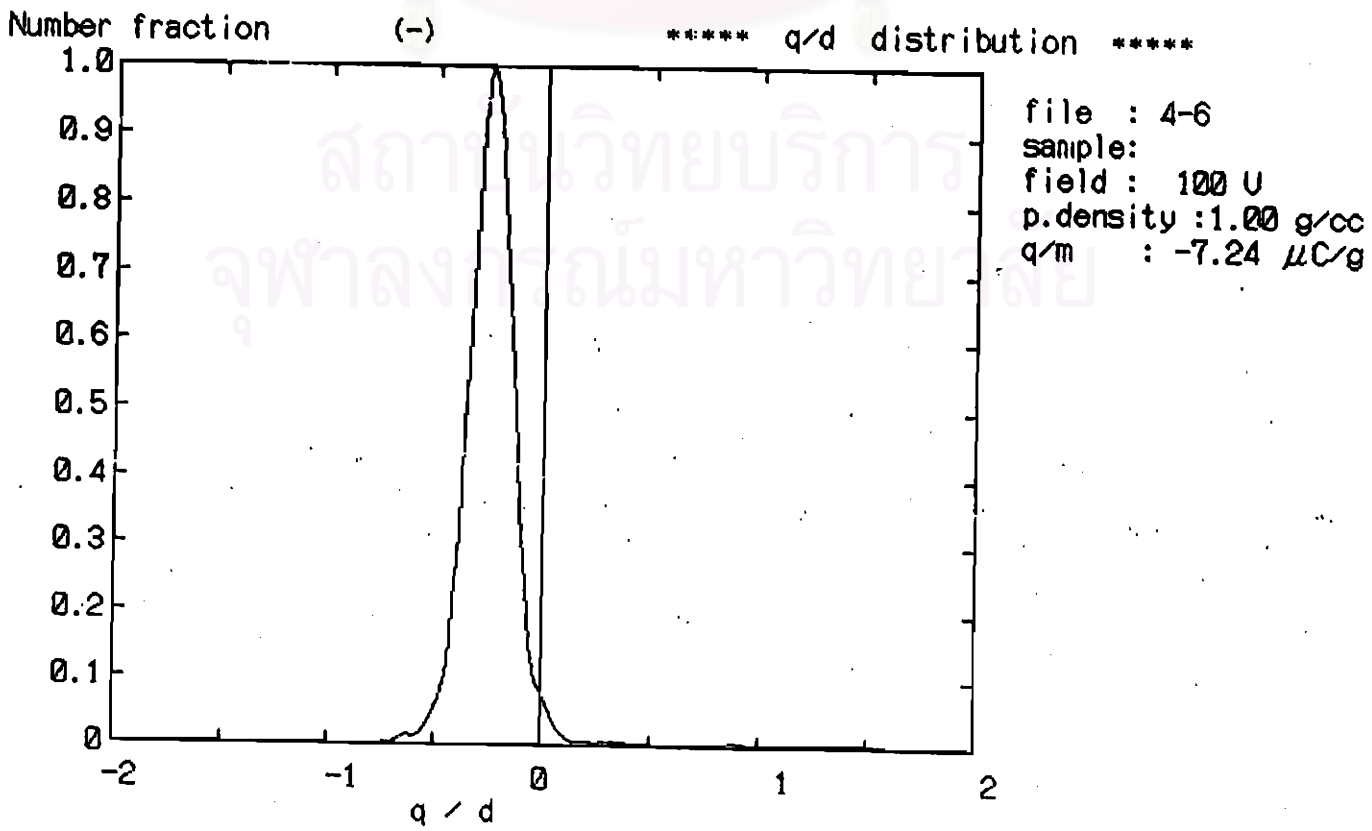
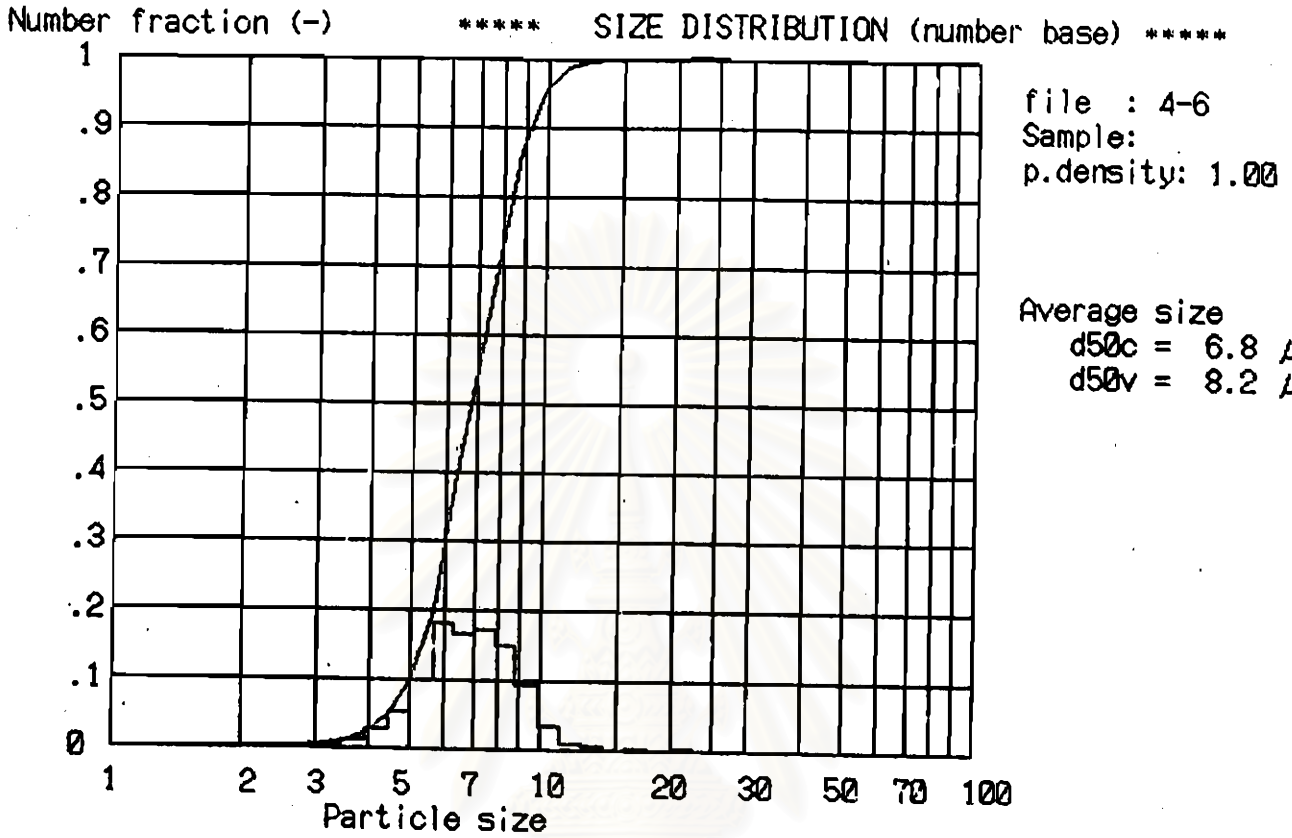
max charge range (femt C) = + 38.783
 max particle charge (neg) (femt C) = -8.9976
 max particle charge (pos) (femt C) = 8.29616

No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	0	0.00(0.000)	0	0.00(0.000)	0	0.00
2	2.2	3	-1.29(0.557)	1	1.03(0.443)	4	-0.26
3	2.5	1	-0.58(1.000)	0	0.00(0.000)	1	-0.58
4	2.9	4	-2.53(1.000)	0	0.00(0.000)	4	-2.53
5	3.3	5	-2.04(0.944)	1	0.12(0.056)	6	-1.92
6	3.7	20	-13.01(0.997)	1	0.05(0.003)	21	-12.97
7	4.2	47	-36.60(1.000)	0	0.00(0.000)	47	-36.60
8	4.7	96	-91.38(0.997)	2	0.23(0.003)	98	-91.14
9	5.3	176	-197.37(0.978)	4	4.39(0.022)	180	-192.99
10	6.0	331	-425.76(0.961)	6	17.48(0.039)	337	-408.28
11	6.7	311	-453.42(0.977)	4	10.56(0.023)	315	-442.86
12	7.5	314	-535.21(0.989)	3	5.94(0.011)	317	-529.27
13	8.4	274	-563.52(0.969)	4	18.16(0.031)	278	-545.36
14	9.3	165	-394.71(0.995)	1	2.01(0.005)	166	-392.69
15	10.5	59	-168.31(1.000)	0	0.00(0.000)	59	-168.31
16	11.8	14	-47.43(1.000)	0	0.00(0.000)	14	-47.43
17	13.3	9	-28.25(1.000)	0	0.00(0.000)	9	-28.25
18	14.9	0	0.00(0.000)	0	0.00(0.000)	0	0.00
19	16.7	2	-9.38(1.000)	0	0.00(0.000)	2	-9.38
20	18.8	0	0.00(0.000)	0	0.00(0.000)	0	0.00
21	21.3	0	0.00(0.000)	1	5.18(1.000)	1	5.18
22	24.2	0	0.00(0.000)	0	0.00(0.000)	0	0.00

average diameter : d50 (count) = 6.84 (μm) d50 (volume) = 8.16 (μm)

	negative	positive	total
count (-)	1831 (0.985)	28 (0.015)	1859
mass (nano gram)	392.3 (0.977)	9.1 (0.023)	401.4
charge (femt C)	-2970.78 (0.979)	65.15 (0.021)	-2905.64
q/m (micro C/g)	-7.57	7.15	-7.24

KT-14b + F-200



N-09C + F-200

date : 97/06/04
 data file name : 4-7C
 sample name :
 measuring time (sec) = 74.75
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -8.9976
 max particle charge (pos) (femt C) = 10.8592

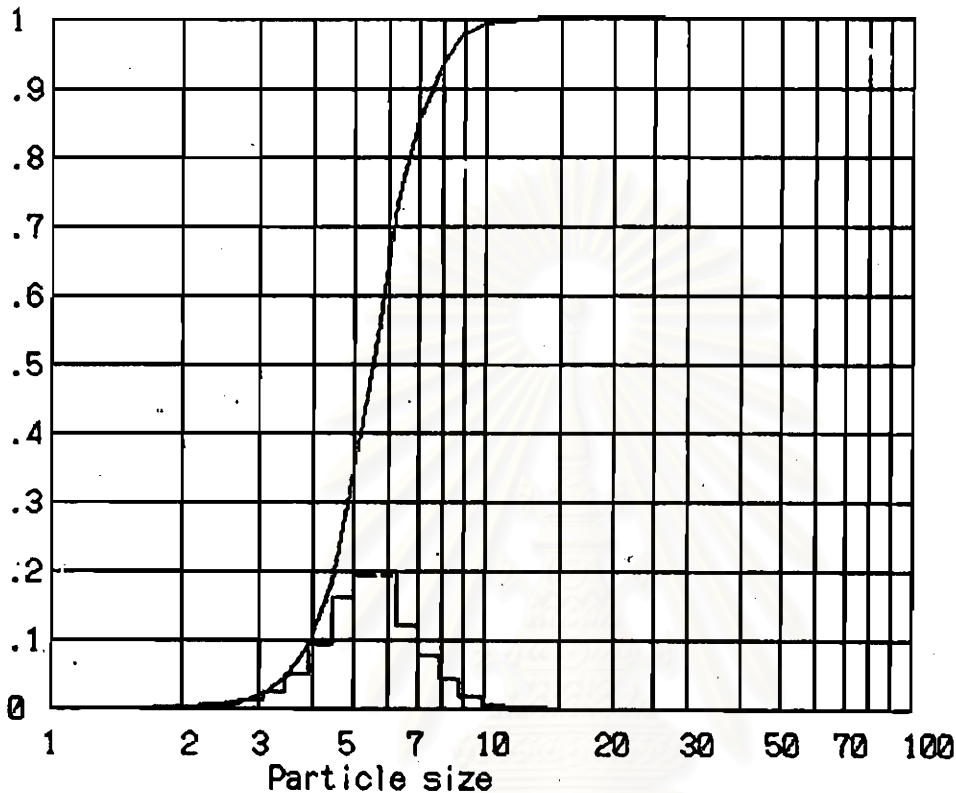
No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	2	-0.80(1.000)	0	0.00(0.000)	2	-0.80
2	2.2	3	-1.34(0.689)	1	0.60(0.311)	4	-0.74
3	2.5	6	-3.73(0.652)	1	1.98(0.348)	7	-1.74
4	2.9	18	-12.10(1.000)	0	0.00(0.000)	18	-12.10
5	3.3	42	-29.71(1.000)	0	0.00(0.000)	42	-29.71
6	3.7	86	-75.63(0.992)	1	0.59(0.008)	87	-75.04
7	4.2	168	-166.10(1.000)	1	0.05(0.000)	169	-166.04
8	4.7	302	-358.23(0.992)	3	2.88(0.008)	305	-355.35
9	5.3	356	-479.81(0.989)	2	5.45(0.011)	358	-474.36
10	6.0	357	-534.84(0.981)	4	10.31(0.019)	361	-524.53
11	6.7	215	-357.22(0.985)	3	5.61(0.015)	218	-351.61
12	7.5	145	-268.08(1.000)	1	0.09(0.000)	146	-267.98
13	8.4	77	-161.05(0.993)	1	1.16(0.007)	78	-159.89
14	9.3	28	-54.44(0.975)	2	1.42(0.025)	30	-53.02
15	10.5	5	-9.73(0.936)	1	0.67(0.064)	6	-9.06
16	11.8	4	-11.41(0.685)	1	5.25(0.315)	5	-6.15
17	13.3	2	-6.77(1.000)	0	0.00(0.000)	2	-6.77
18	14.9	0	0.00(0.000)	0	0.00(0.000)	0	0.00
19	16.7	0	0.00(0.000)	0	0.00(0.000)	0	0.00
20	18.8	0	0.00(0.000)	0	0.00(0.000)	0	0.00
21	21.3	0	0.00(0.000)	0	0.00(0.000)	0	0.00
22	24.2	0	0.00(0.000)	0	0.00(0.000)	0	0.00

average diameter : d50 (count) = 5.50(μm) d50 (volume) = 6.53(μm)

	negative		positive		total
count (-)	1816	(0.988)	22	(0.012)	1838
mass (nano gram)	202.9	(0.980)	4.1	(0.020)	207.0
charge (femt C)	-2530.97	(0.986)	36.08	(0.014)	-2494.89
q/m (micro C/g)	-12.48		8.70		-12.05

N-09C + F-200

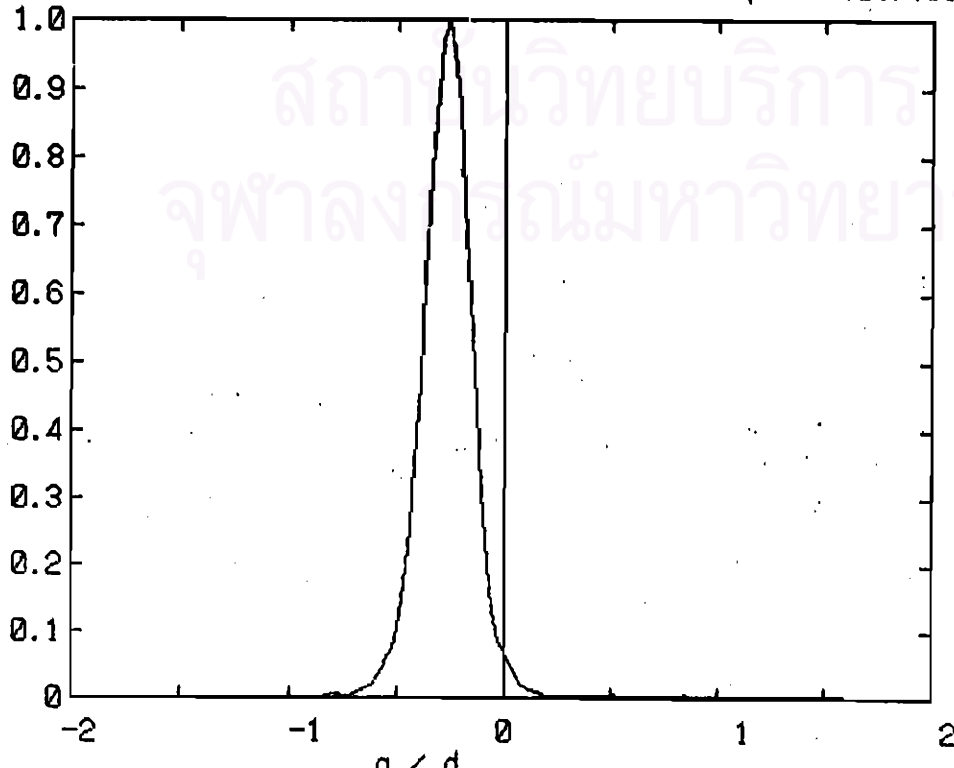
Number fraction (-) ***** SIZE DISTRIBUTION (number base) *****



file : 4-7
 Sample:
 p.density: 1.00

Average size
 d50c = 5.5 μm
 d50v = 6.5 μm

Number fraction (-) ***** q/d distribution *****



file : 4-7
 Sample:
 field : 100 U
 p.density : 1.00 g/cc
 q/m : -12.05 $\mu\text{C/g}$

N-09C + F-200

date : 97/06/04
 data file name : 4-8C
 sample name :
 measuring time (sec) = 73.5
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -6.2728
 max particle charge (pos) (femt C) = 9.61056

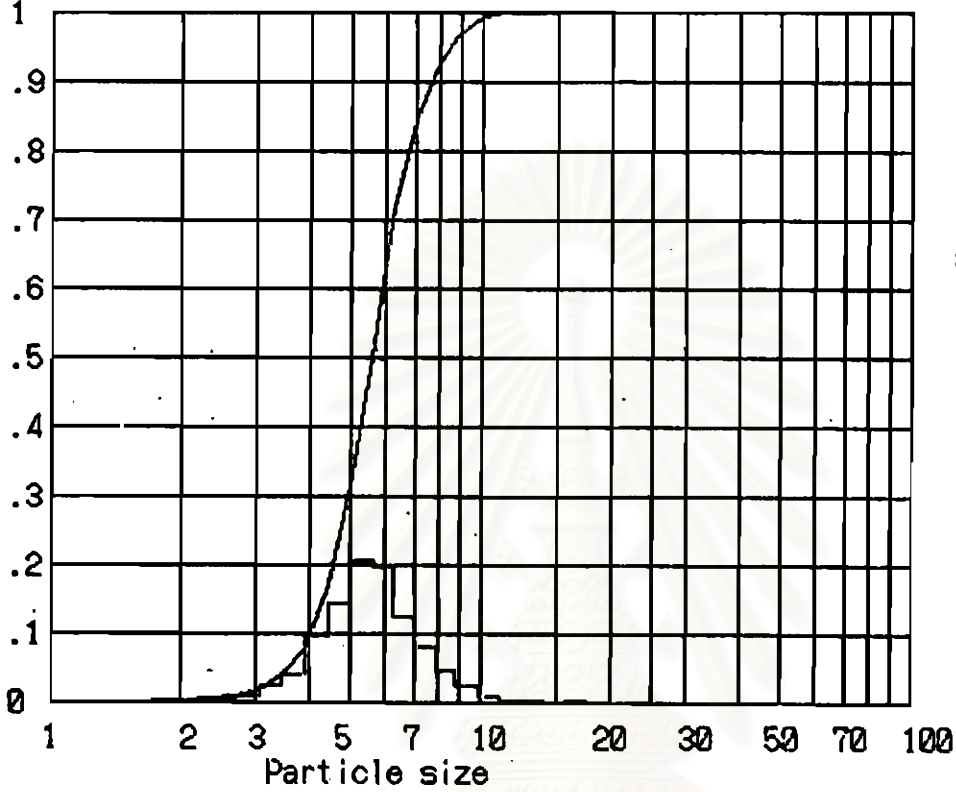
No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	3	-1.18(0.631)	1	0.69(0.369)	4	-0.49
2	2.2	6	-2.05(1.000)	0	0.00(0.000)	6	-2.05
3	2.5	5	-2.66(1.000)	0	0.00(0.000)	5	-2.66
4	2.9	14	-9.42(1.000)	0	0.00(0.000)	14	-9.42
5	3.3	40	-28.19(0.878)	2	3.91(0.122)	42	-24.28
6	3.7	65	-50.92(0.945)	1	2.96(0.055)	66	-47.96
7	4.2	166	-159.99(0.989)	5	1.71(0.011)	171	-158.28
8	4.7	259	-289.81(1.000)	0	0.00(0.000)	259	-289.81
9	5.3	365	-454.89(0.974)	8	12.23(0.026)	373	-442.66
10	6.0	362	-521.31(0.973)	3	14.57(0.027)	365	-506.74
11	6.7	220	-341.72(0.986)	5	4.78(0.014)	225	-336.94
12	7.5	143	-264.68(0.931)	4	19.61(0.069)	147	-245.07
13	8.4	84	-172.56(0.940)	2	10.98(0.060)	86	-161.58
14	9.3	45	-100.48(0.864)	2	15.86(0.136)	47	-84.62
15	10.5	14	-33.32(0.896)	1	3.86(0.104)	15	-29.45
16	11.8	2	-4.20(1.000)	0	0.00(0.000)	2	-4.20
17	13.3	1	-3.21(1.000)	0	0.00(0.000)	1	-3.21
18	14.9	0	0.00(0.000)	0	0.00(0.000)	0	0.00
19	16.7	1	-2.34(1.000)	0	0.00(0.000)	1	-2.34
20	18.8	0	0.00(0.000)	0	0.00(0.000)	0	0.00
21	21.3	0	0.00(0.000)	0	0.00(0.000)	0	0.00
22	24.2	0	0.00(0.000)	0	0.00(0.000)	0	0.00

average diameter : d50 (count) = 5.57(μm) d50 (volume) = 6.63(μm)

	negative	positive	total
count (-)	1795 (0.981)	34 (0.019)	1829
mass (nano gram)	215.7 (0.978)	4.9 (0.022)	220.7
charge (femt C)	-2442.94 (0.964)	91.16 (0.036)	-2351.78
q/m (micro C/g)	-11.32	18.49	-10.66

N-09C + F-200

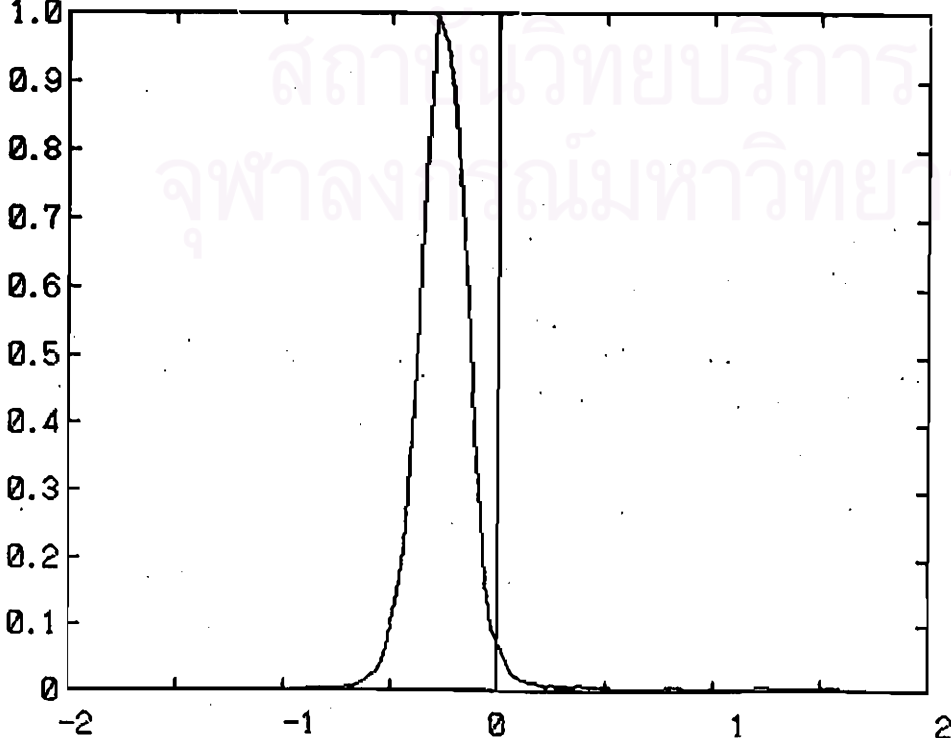
Number fraction (-) ***** SIZE DISTRIBUTION (number base) *****



file : 4-8
Sample:
p.density: 1.00

Average size
d50c = 5.6 μm
d50v = 6.6 μm

Number fraction (-) ***** q/d distribution *****



file : 4-8
sample:
field : 100 U
p.density : 1.00 g/cc
q/m : -10.66 μC/g

N-09S + F-200

date : 97/06/04
 data file name : 4-9C
 sample name :
 measuring time (sec) = 96
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -13.3413
 max particle charge (pos) (femt C) = 15.0589

No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	4	-2.18(1.000)	0	0.00(0.000)	4	-2.18
2	2.2	2	-1.10(1.000)	0	0.00(0.000)	2	-1.10
3	2.5	1	-0.21(0.700)	1	0.09(0.300)	2	-0.12
4	2.9	8	-5.34(1.000)	0	0.00(0.000)	8	-5.34
5	3.3	18	-20.68(0.842)	1	3.87(0.158)	19	-16.81
6	3.7	56	-65.53(0.896)	4	7.65(0.104)	60	-57.88
7	4.2	97	-130.11(0.992)	1	0.98(0.008)	98	-129.13
8	4.7	155	-268.44(0.981)	2	5.29(0.019)	157	-263.16
9	5.3	219	-466.07(0.999)	3	0.46(0.001)	222	-465.60
10	6.0	389	-997.31(0.993)	5	6.65(0.007)	394	-990.66
11	6.7	453	-1327.11(0.995)	6	6.37(0.005)	459	-1320.74
12	7.5	366	-1197.74(0.991)	1	10.28(0.009)	367	-1187.46
13	8.4	82	-304.16(0.998)	1	0.74(0.002)	83	-303.42
14	9.3	27	-100.01(0.827)	3	20.95(0.173)	30	-79.06
15	10.5	13	-61.97(1.000)	0	0.00(0.000)	13	-61.97
16	11.8	3	-12.76(0.867)	1	1.95(0.133)	4	-10.81
17	13.3	4	-24.36(0.993)	1	0.17(0.007)	5	-24.19
18	14.9	2	-10.67(1.000)	0	0.00(0.000)	2	-10.67
19	16.7	0	0.00(0.000)	0	0.00(0.000)	0	0.00
20	18.8	0	0.00(0.000)	0	0.00(0.000)	0	0.00
21	21.3	0	0.00(0.000)	0	0.00(0.000)	0	0.00
22	24.2	0	0.00(0.000)	1	2.17(1.000)	1	2.17

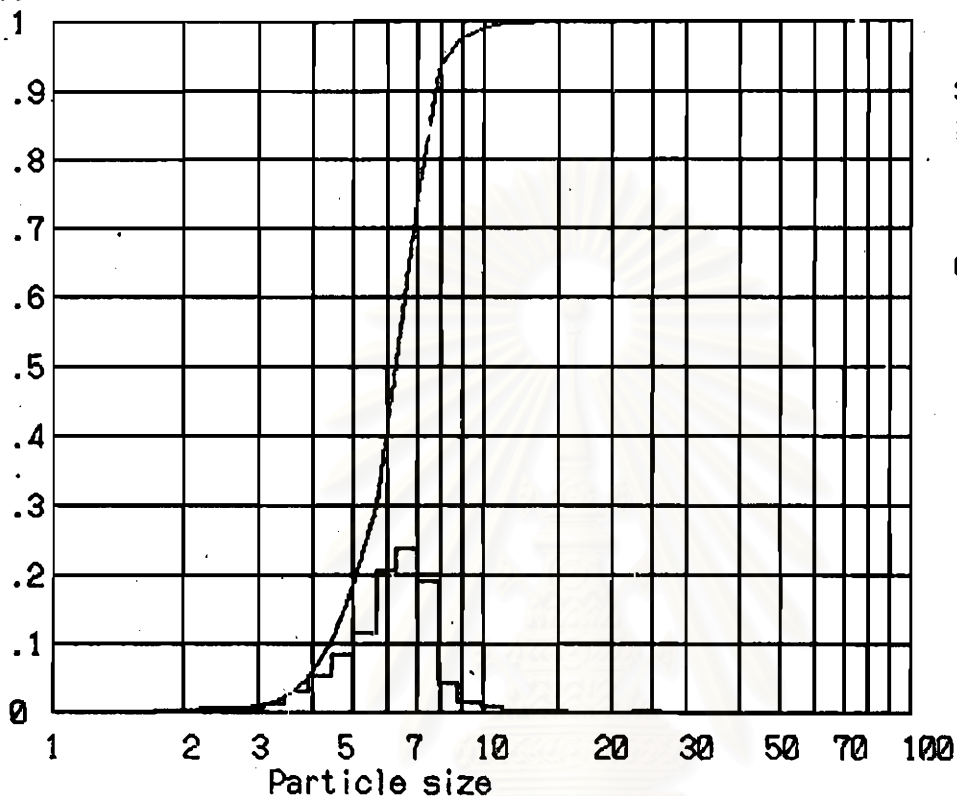
average diameter : d50 (count) = 6.27(μm) d50 (volume) = 7.05(μm)

	negative		positive		total
count (-)	1899	(0.984)	31	(0.016)	1930
mass (nano gram)	279.6	(0.955)	13.3	(0.045)	292.9
charge (femt C)	-4995.75	(0.987)	67.62	(0.013)	-4928.13
q/m (micro C/g)	-17.87		5.07		-16.82

N-09S + F-200

Number fraction (-)

***** SIZE DISTRIBUTION (number base) *****



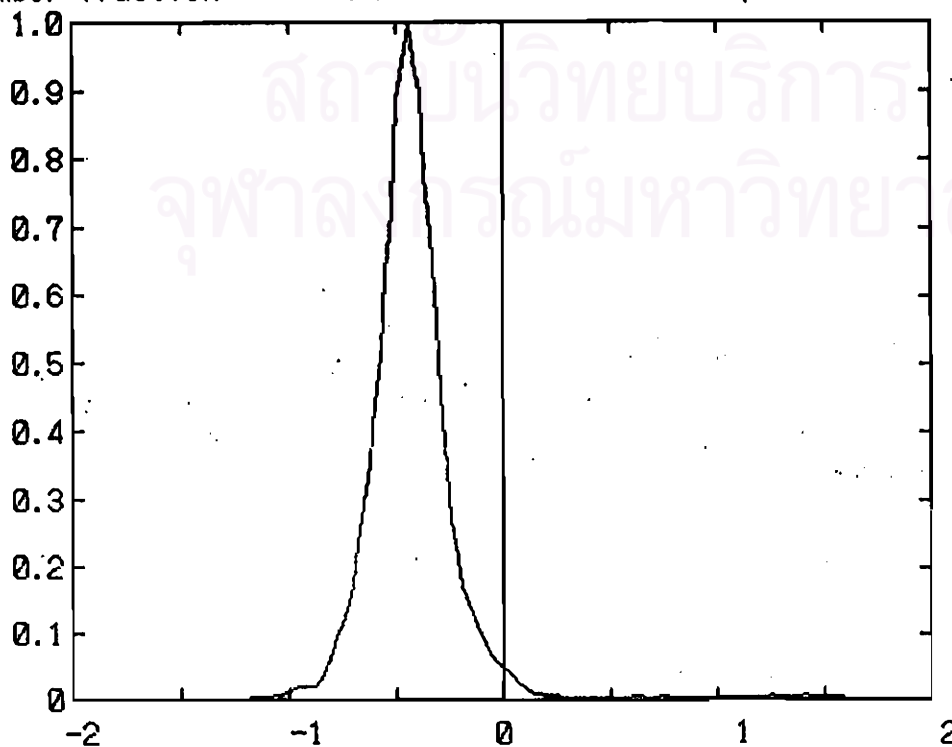
file : 4-9
 Sample:
 p.density: 1.00

Average size
 $d_{50c} = 6.3 \mu\text{m}$
 $d_{50v} = 7.0 \mu\text{m}$

Number fraction

(-)

***** q/d distribution *****



file : 4-9
 sample:
 field : 100 U
 p.density : 1.00 g/cc
 $q/m : -16.82 \mu\text{C/g}$

N-09S + F-200

date : 97/06/04
 data file name : 4-10C
 sample name :
 measuring time (sec) = 107.5
 field voltage applied (V) = 100
 particle density (g/cm³) = 1

max charge range (femt C) = +- 38.783
 max particle charge (neg) (femt C) = -14.5824
 max particle charge (pos) (femt C) = 8.63136

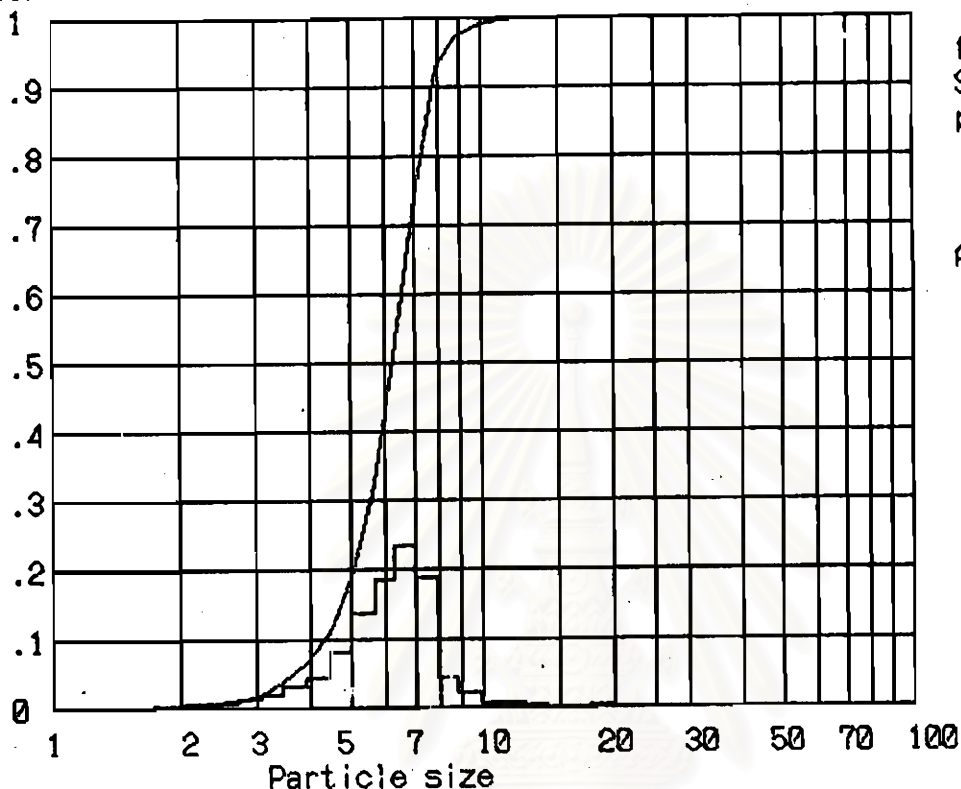
No.	ave. dia. (μm)	negative		positive		total	
		(-)	(femt C)	(-)	(femt C)	(-)	(femt C)
1	1.9	1	-0.16(1.000)	0	0.00(0.000)	1	-0.16
2	2.2	6	-3.00(1.000)	0	0.00(0.000)	6	-3.00
3	2.5	8	-4.70(1.000)	0	0.00(0.000)	8	-4.70
4	2.9	18	-11.53(0.991)	1	0.11(0.009)	19	-11.43
5	3.3	28	-22.36(0.991)	1	0.20(0.009)	29	-22.16
6	3.7	56	-50.96(0.984)	4	0.82(0.016)	60	-50.15
7	4.2	81	-99.05(1.000)	0	0.00(0.000)	81	-99.05
8	4.7	145	-243.54(0.981)	6	4.70(0.019)	151	-238.84
9	5.3	251	-502.22(0.984)	7	8.31(0.016)	258	-493.91
10	6.0	348	-882.62(0.995)	7	4.41(0.005)	355	-878.22
11	6.7	441	-1252.02(0.987)	10	16.26(0.013)	451	-1235.77
12	7.5	354	-1102.69(0.999)	3	0.85(0.001)	357	-1101.84
13	8.4	83	-272.79(0.978)	2	6.13(0.022)	85	-266.66
14	9.3	34	-124.75(0.991)	2	1.18(0.009)	36	-123.56
15	10.5	9	-31.05(1.000)	0	0.00(0.000)	9	-31.05
16	11.8	7	-29.27(1.000)	0	0.00(0.000)	7	-29.27
17	13.3	3	-12.01(1.000)	0	0.00(0.000)	3	-12.01
18	14.9	0	0.00(0.000)	0	0.00(0.000)	0	0.00
19	16.7	0	0.00(0.000)	0	0.00(0.000)	0	0.00
20	18.8	1	-11.31(1.000)	0	0.00(0.000)	1	-11.31
21	21.3	0	0.00(0.000)	0	0.00(0.000)	0	0.00
22	24.2	0	0.00(0.000)	0	0.00(0.000)	0	0.00

average diameter : d50 (count) = 6.26(μm) d50 (volume) = 7.03(μm)

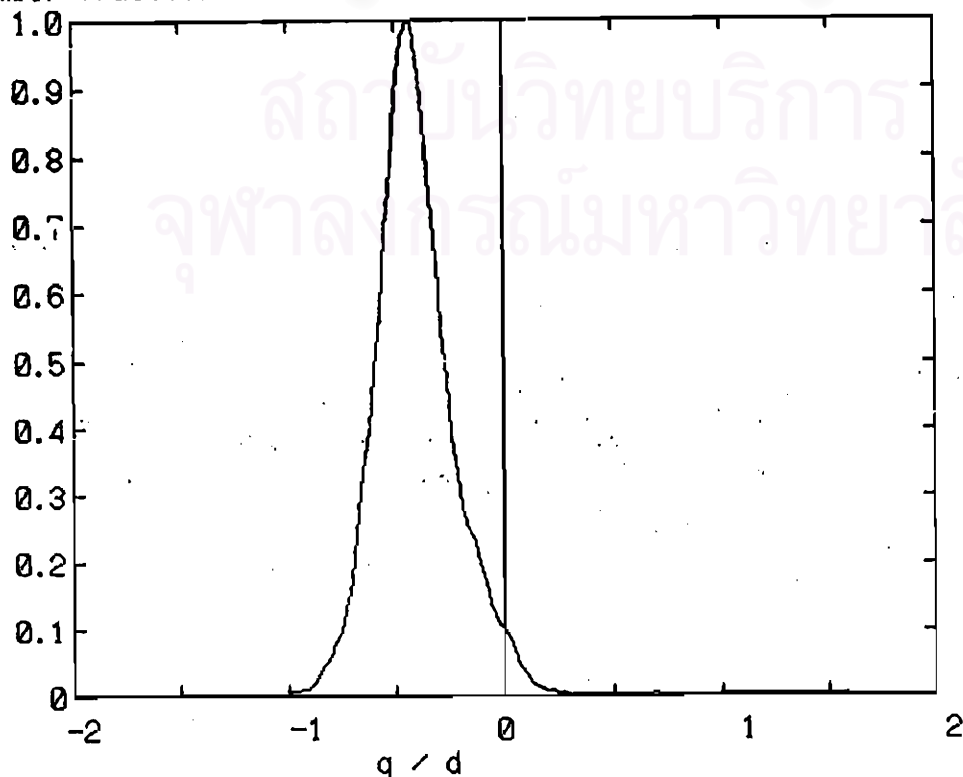
	negative		positive		total
count (-)	1874	(0.978)	43	(0.022)	1917
mass (nano gram)	275.4	(0.981)	5.5	(0.019)	280.9
charge (femt C)	-4656.03	(0.991)	42.95	(0.009)	-4613.08
q/m (micro C/g)	-16.91		7.88		-16.43

N-09S + F-200

Number fraction (-) ***** SIZE DISTRIBUTION (number base) *****



Number fraction (-) ***** q/d distribution *****



APPENDIX B

MORPHOLOGIES OF THE CARRIERS AND TONERS BY SEM



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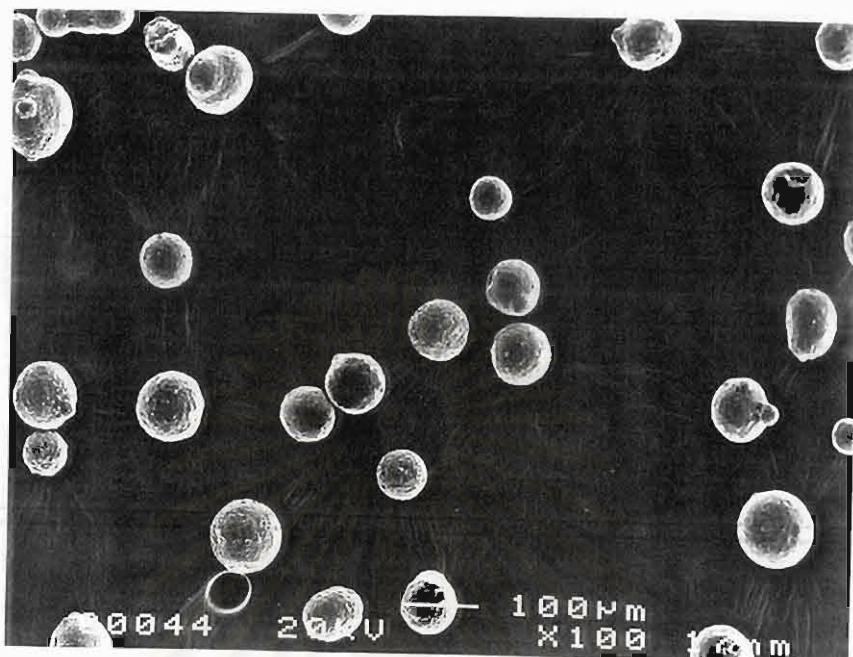


Figure B-1 Typical SEM micrograph of A-300 carrier (x100)

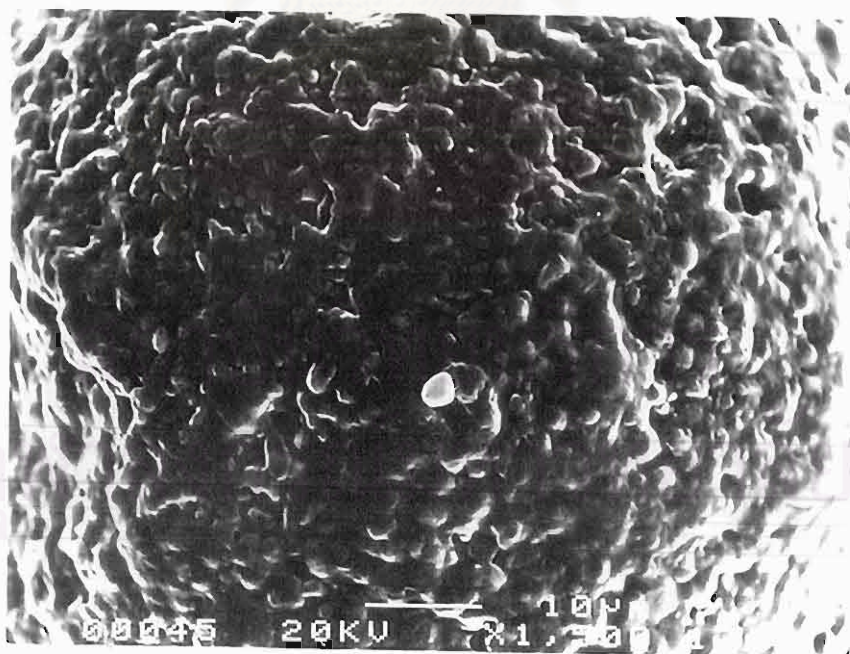


Figure B-2 Typical SEM micrograph of A-300 carrier (x1,500)

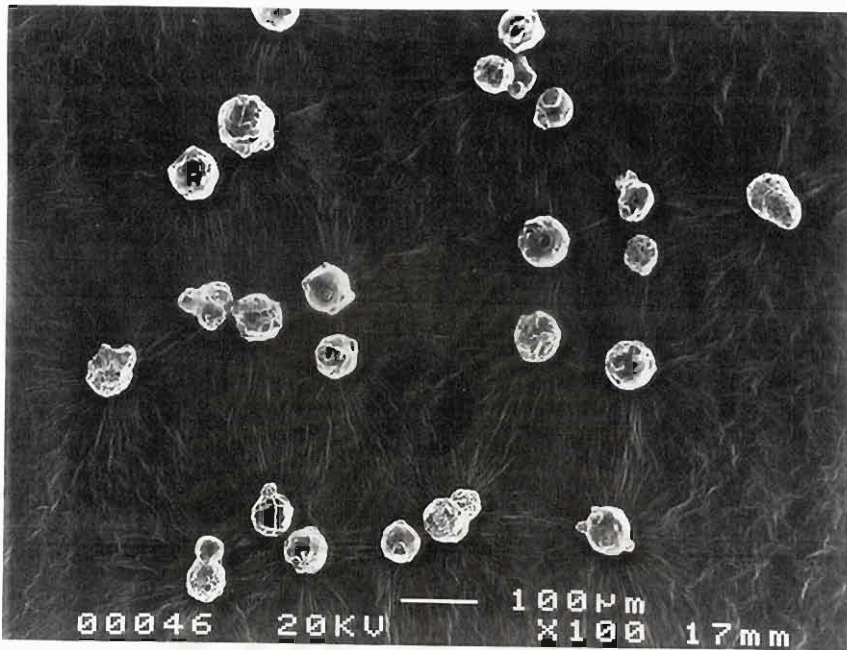


Figure B-3 Typical SEM micrograph of F-200 carrier (x100)

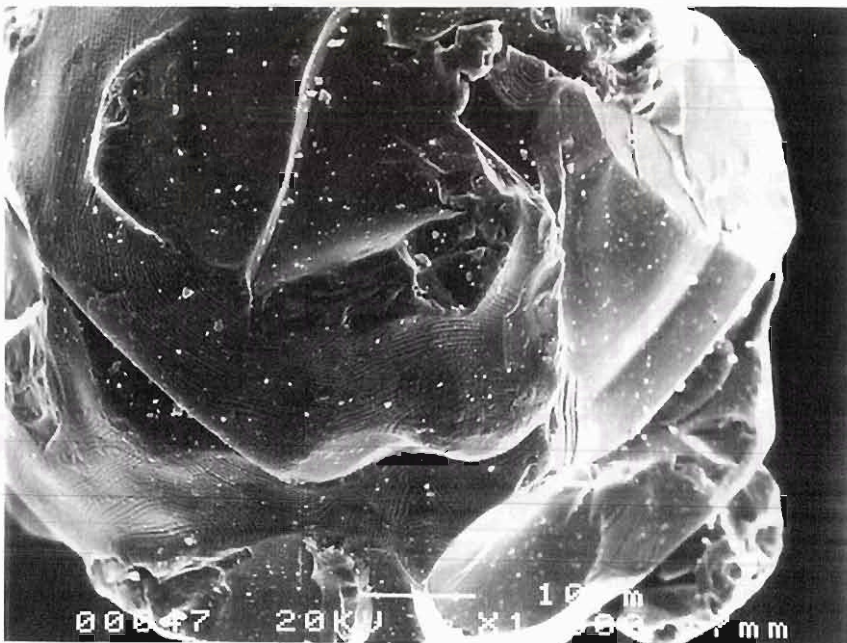


Figure B-4 Typical SEM micrograph of F-200 carrier (x1,500)

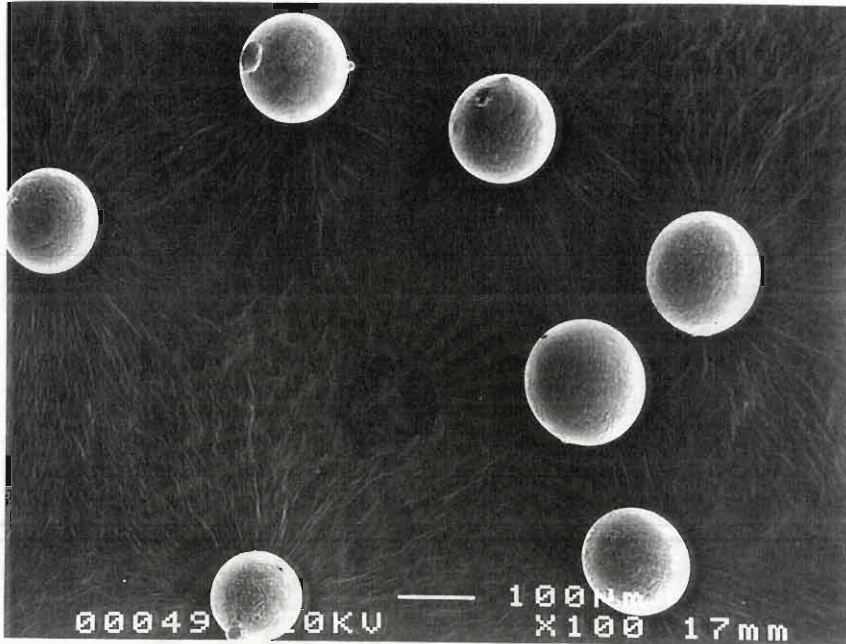


Figure B-5 Typical SEM micrograph of Iron Shot carrier (x100)

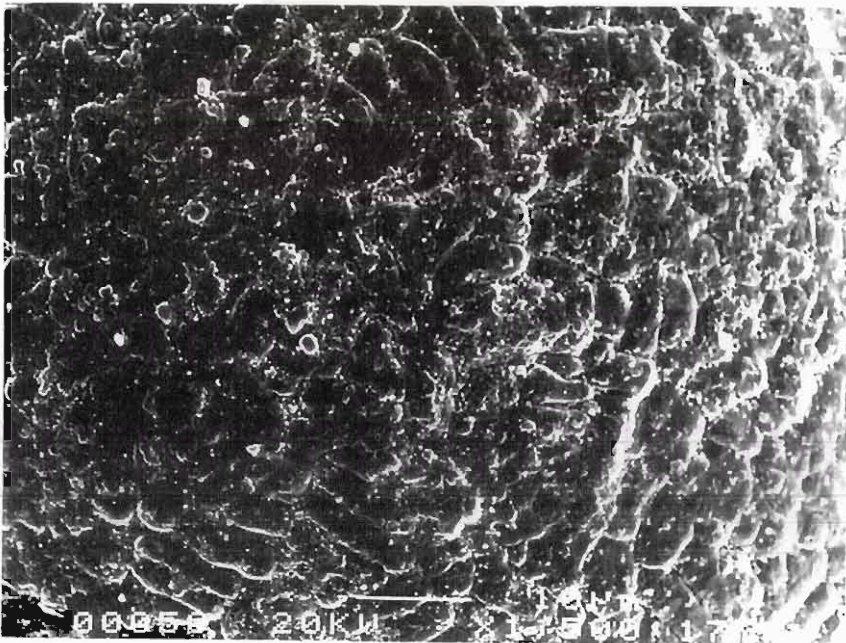


Figure B-6 Typical SEM micrograph of Iron Shot carrier (x1,500)

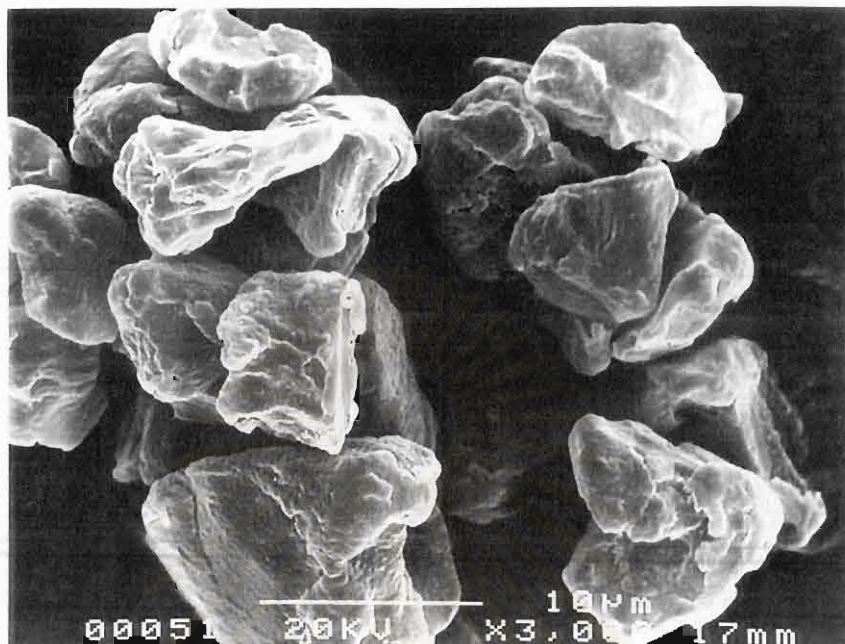


Figure B-7 Typical SEM micrograph of KT-04a (x3,000)

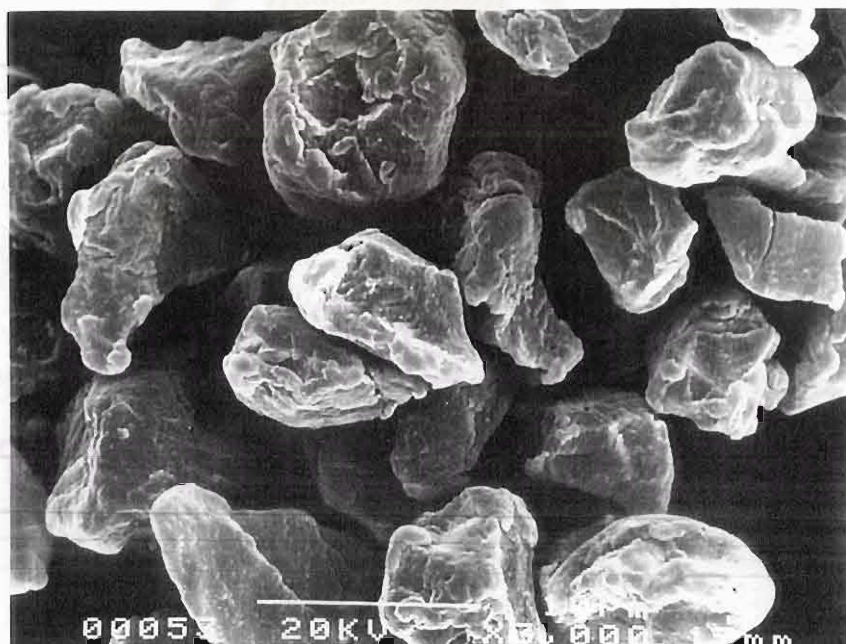


Figure B-8 Typical SEM micrograph of KT-05a (x3,000)

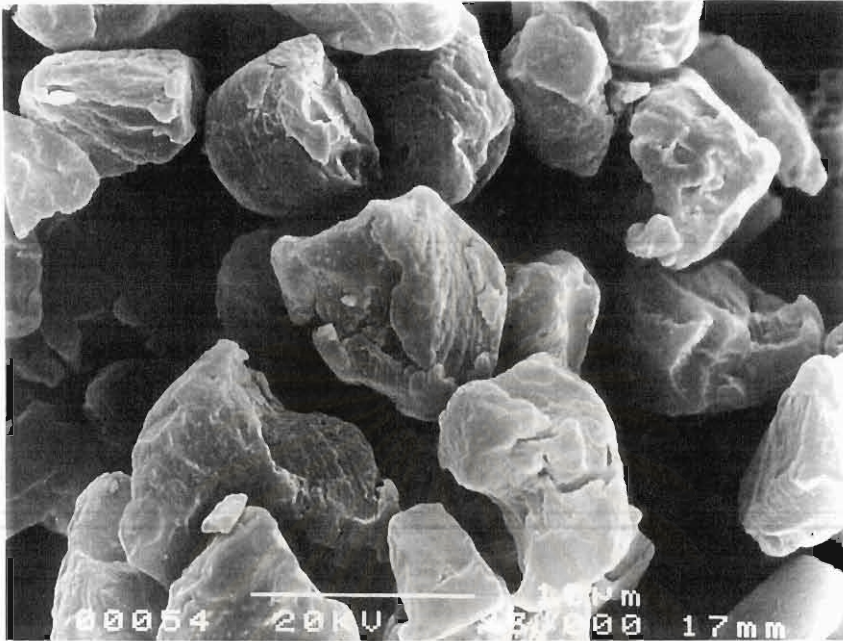


Figure B-9 Typical SEM micrograph of KT-06a (x3,000)

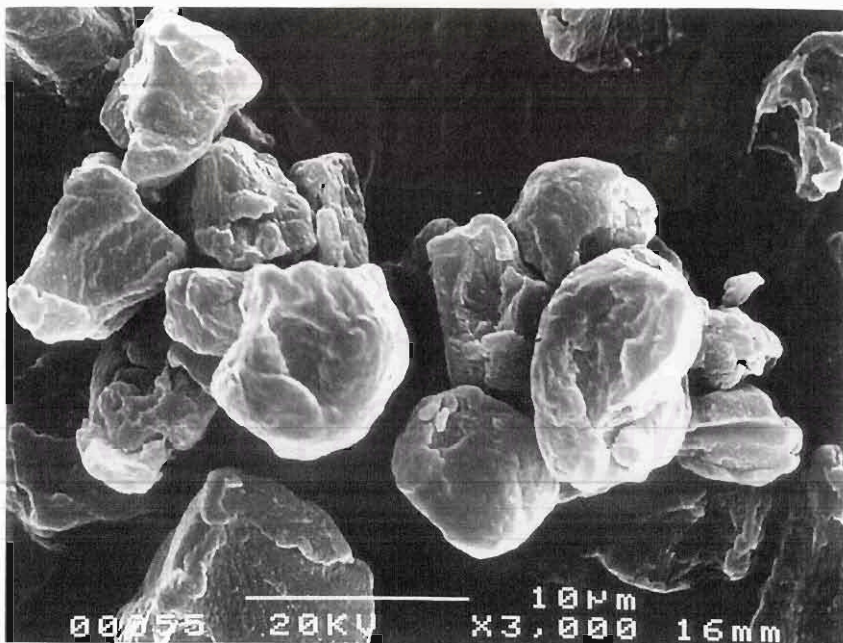


Figure B-10 Typical SEM micrograph of KT-07a (x3,000)

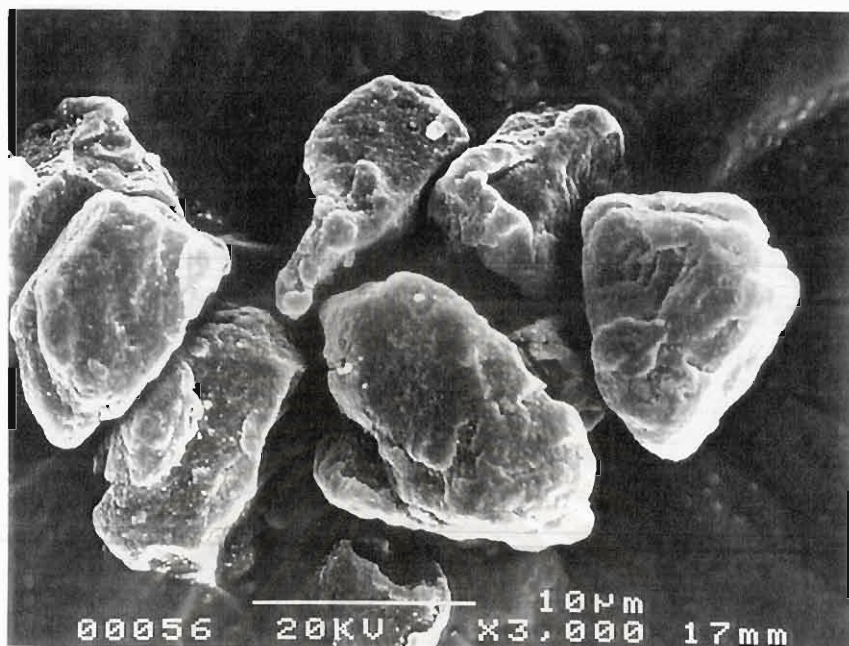


Figure B-11 Typical SEM micrograph of KT-04b (x3,000)

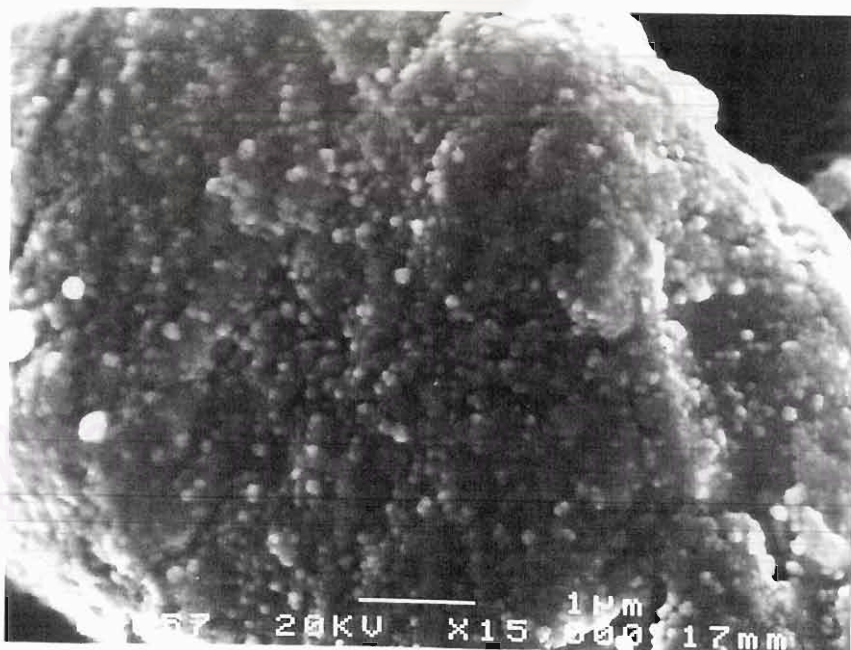


Figure B-12 Typical SEM micrograph of KT-04b (x15,000)

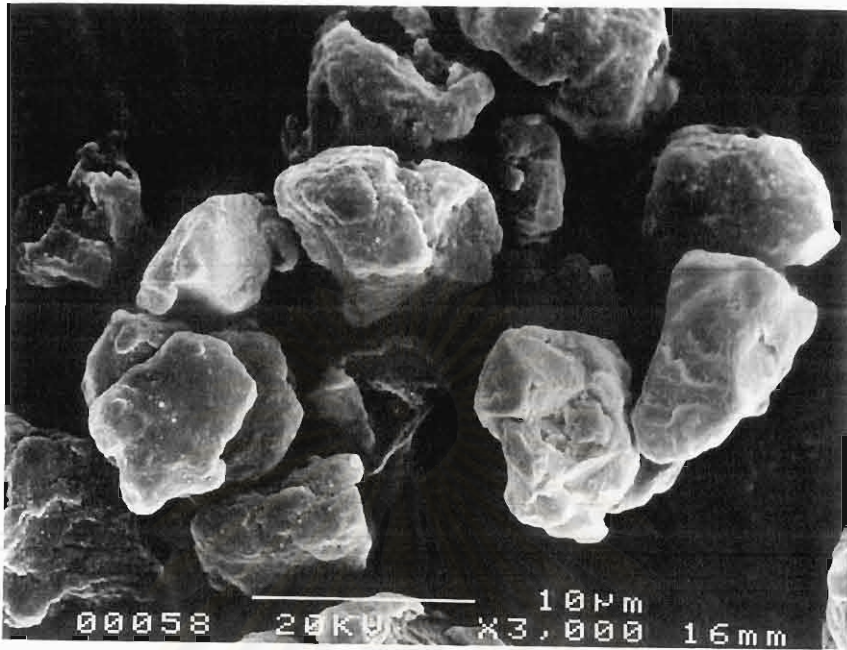


Figure B-13 Typical SEM micrograph of KT-05b (x3,000)

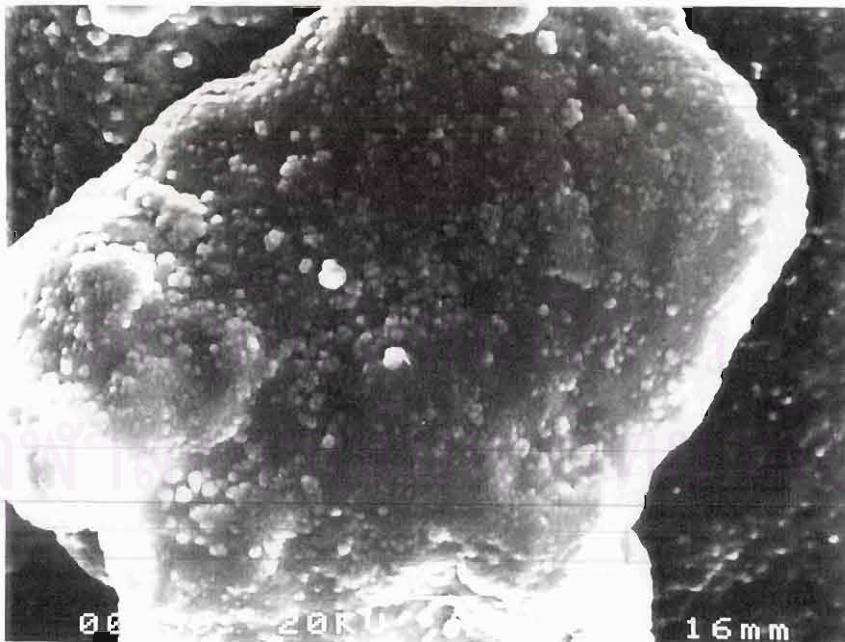


Figure B-14 Typical SEM micrograph of KT-05b (x15,000)

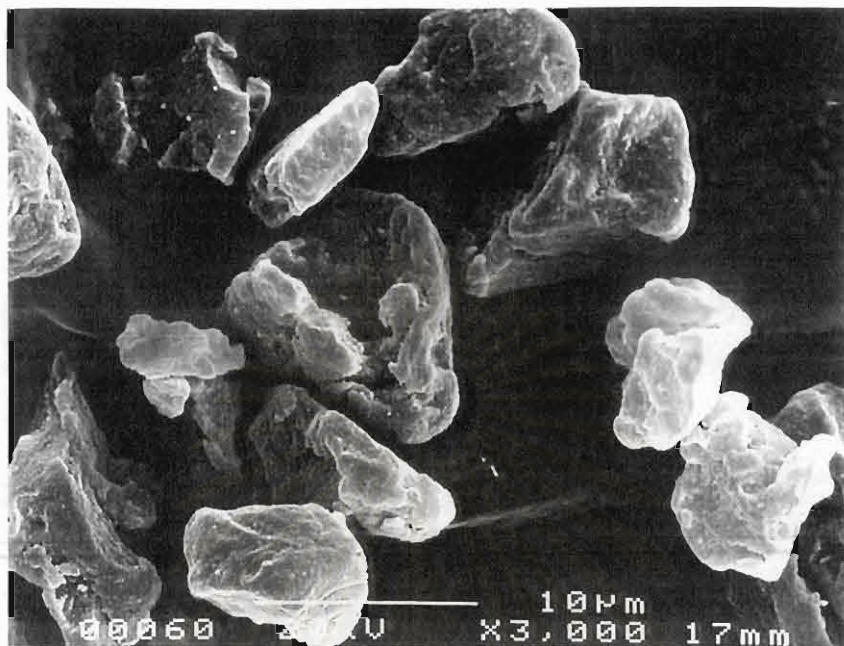


Figure B-15 Typical SEM micrograph of KT-06b (x3,000)

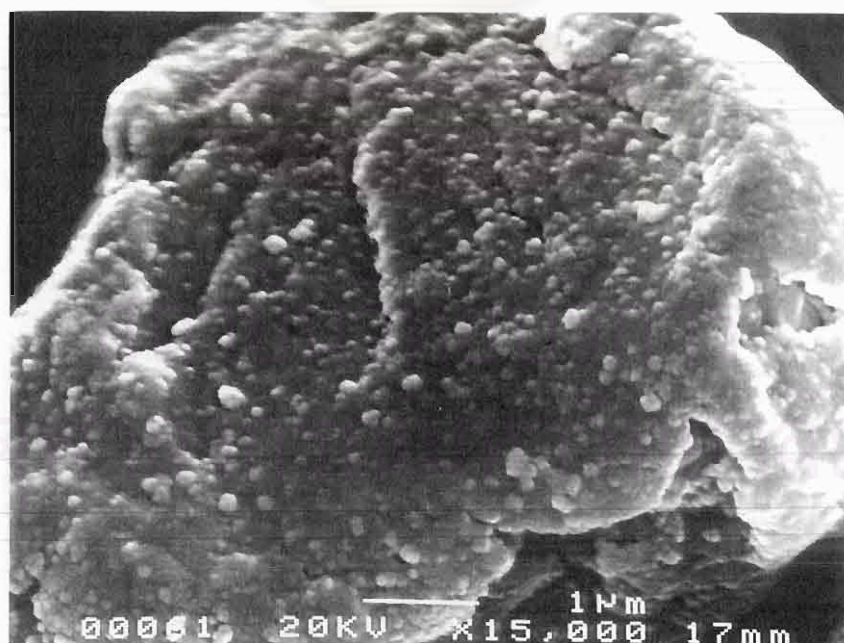


Figure B-16 Typical SEM micrograph of KT-06b (x15,000)

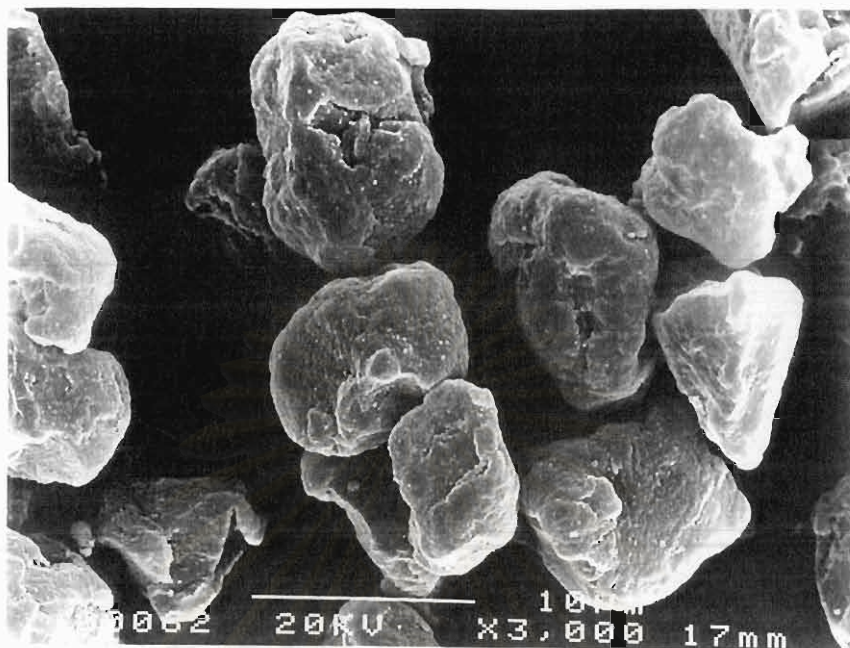


Figure B-17 Typical SEM micrograph of KT-07b (x3,000)

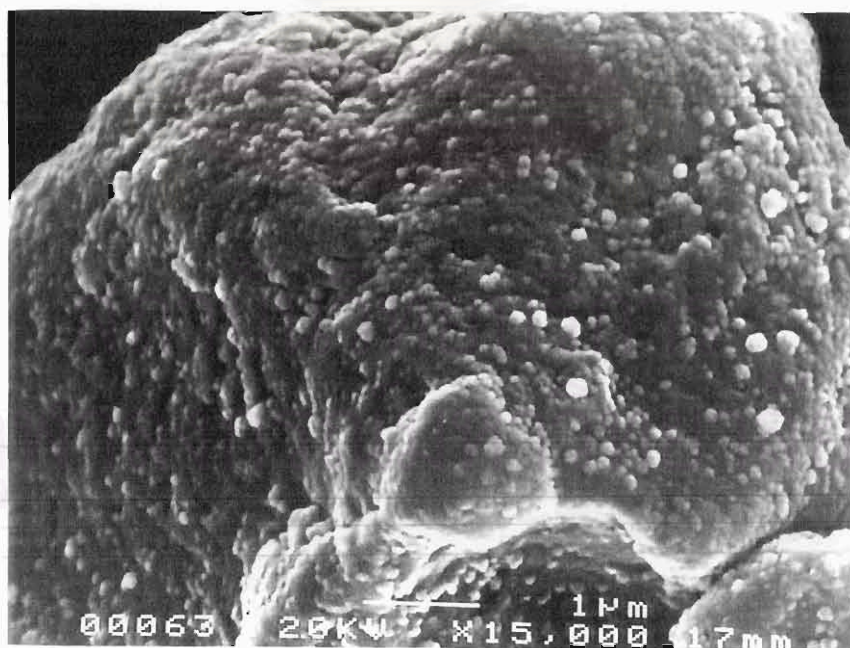


Figure B-18 Typical SEM micrograph of KT-07b (x15,000)

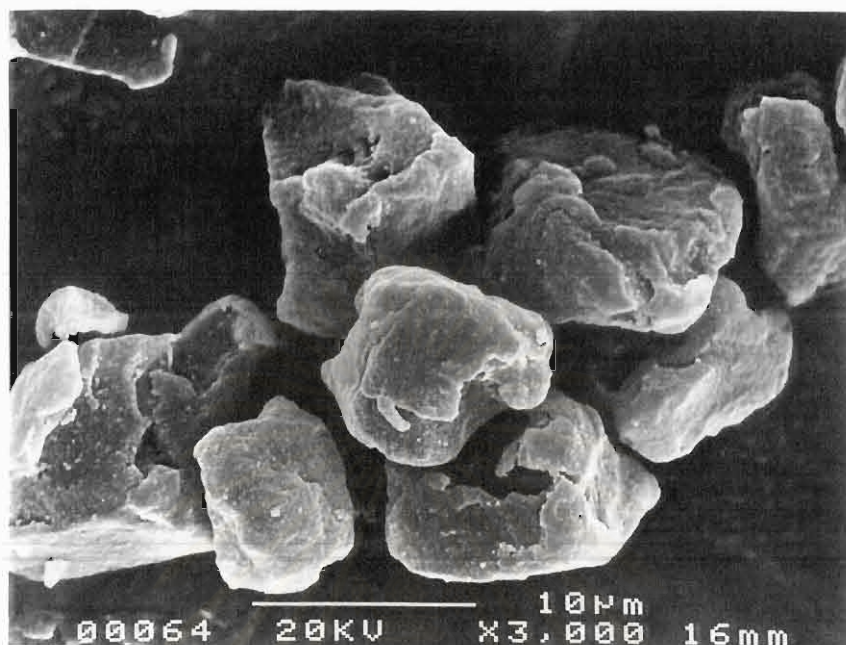


Figure B-19 Typical SEM micrograph of KT-08b (x3,000)

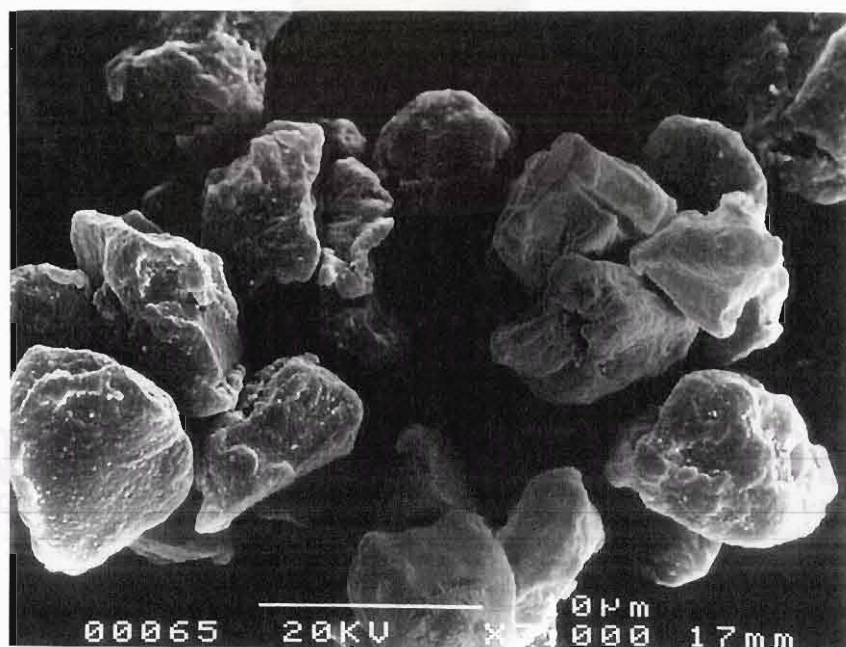


Figure B-20 Typical SEM micrograph of KT-09b (x3,000)

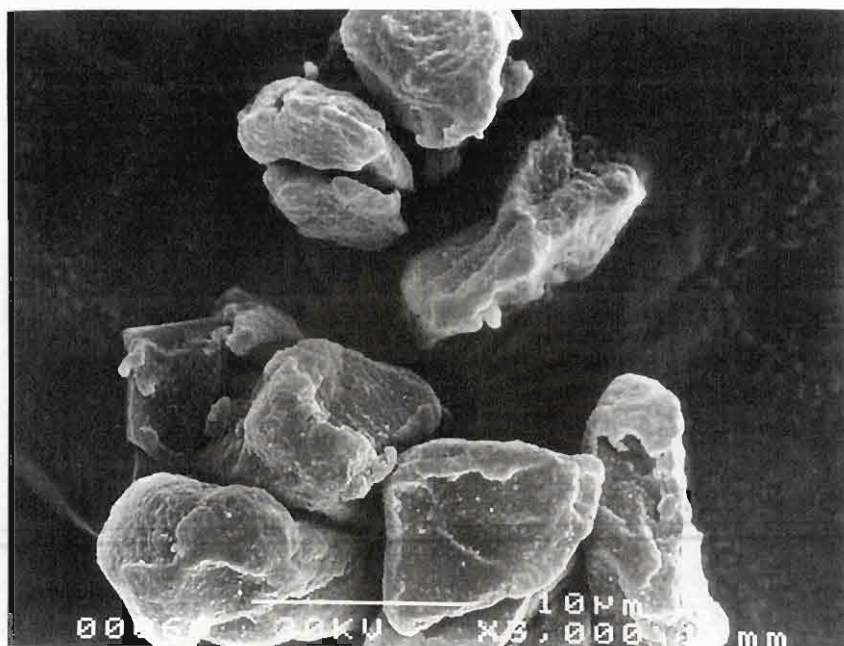


Figure B-21 Typical SEM micrograph of KT-10b (x3,000)

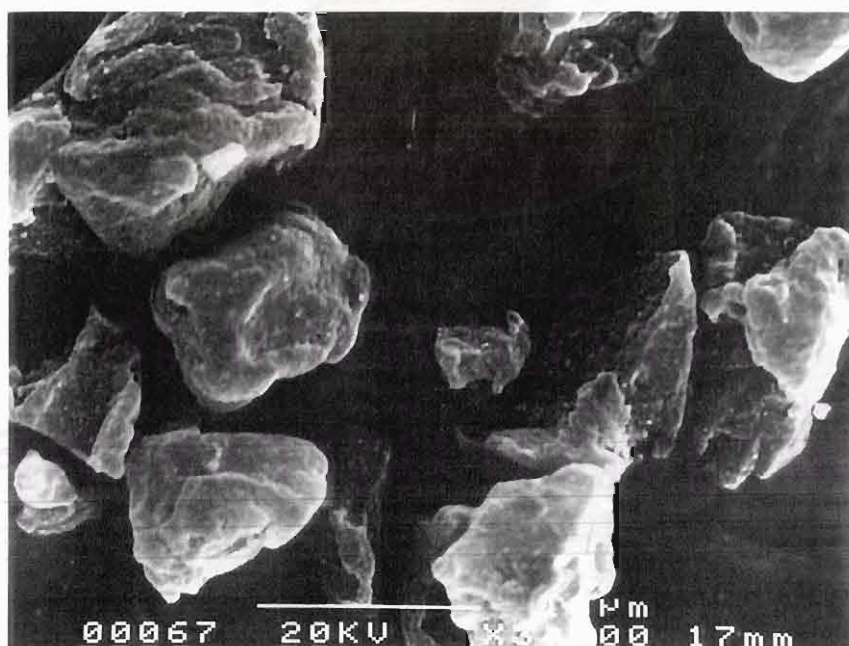


Figure B-22 Typical SEM micrograph of KT-11b (x3,000)

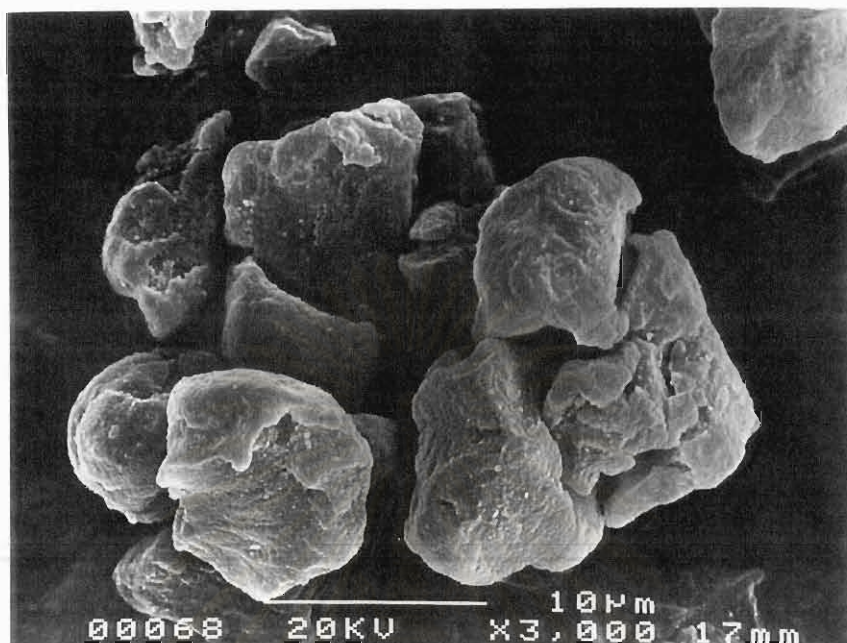


Figure B-23 Typical SEM micrograph of KT-12b (x3,000)

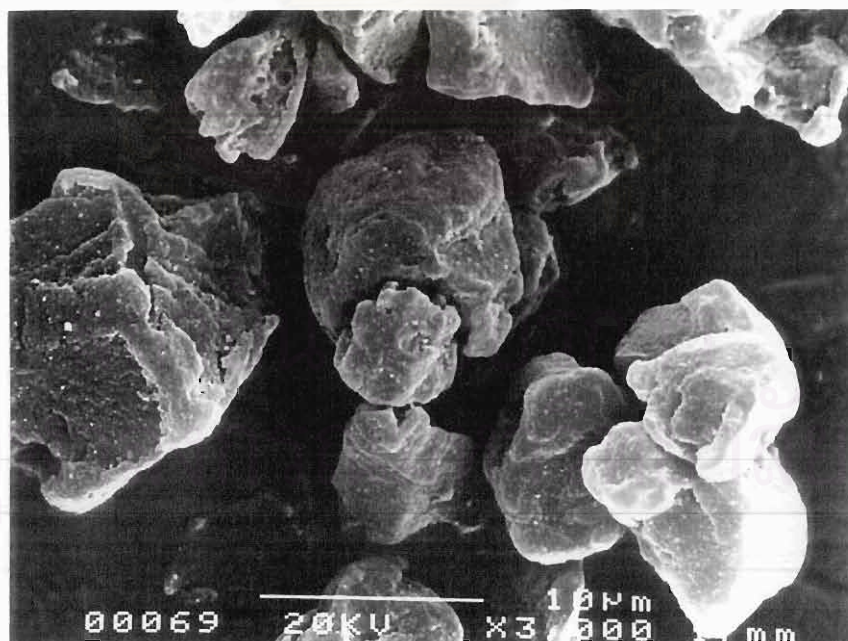


Figure B-24 Typical SEM micrograph of KT-13b (x3,000)



Figure B-25 Typical SEM micrograph of KT-14b (x3,000)

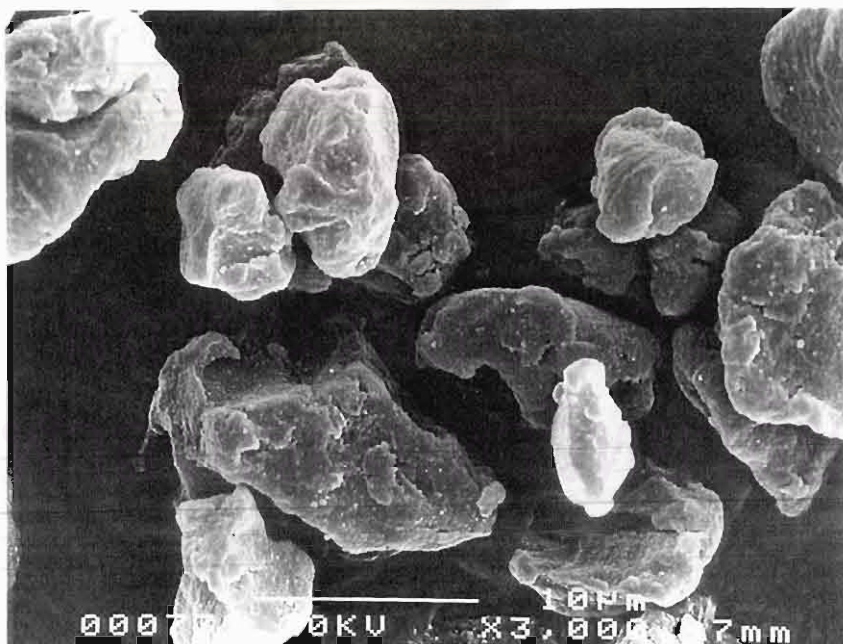


Figure B-26 Typical SEM micrograph of KT-15b (x3,000)

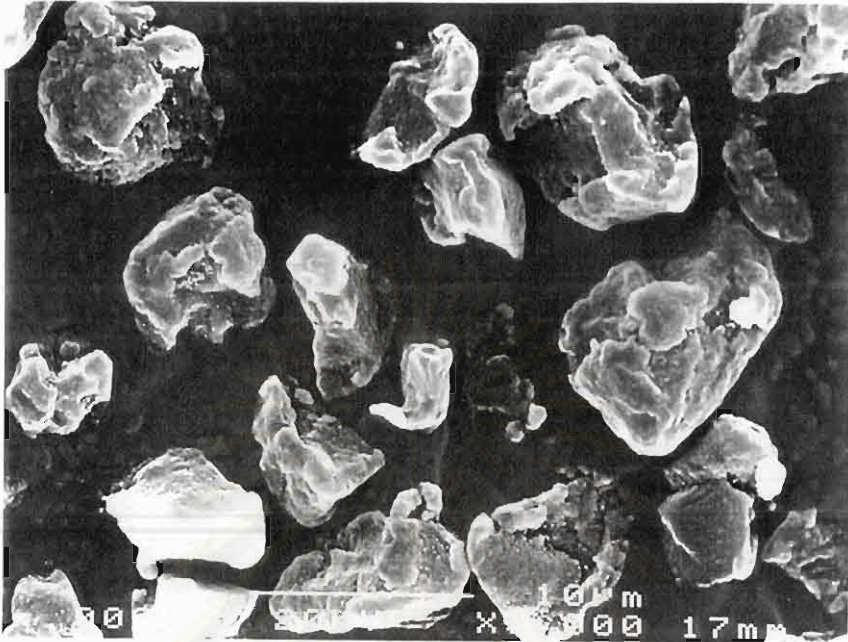


Figure B-27 Typical SEM micrograph of N-09C (x3,000)

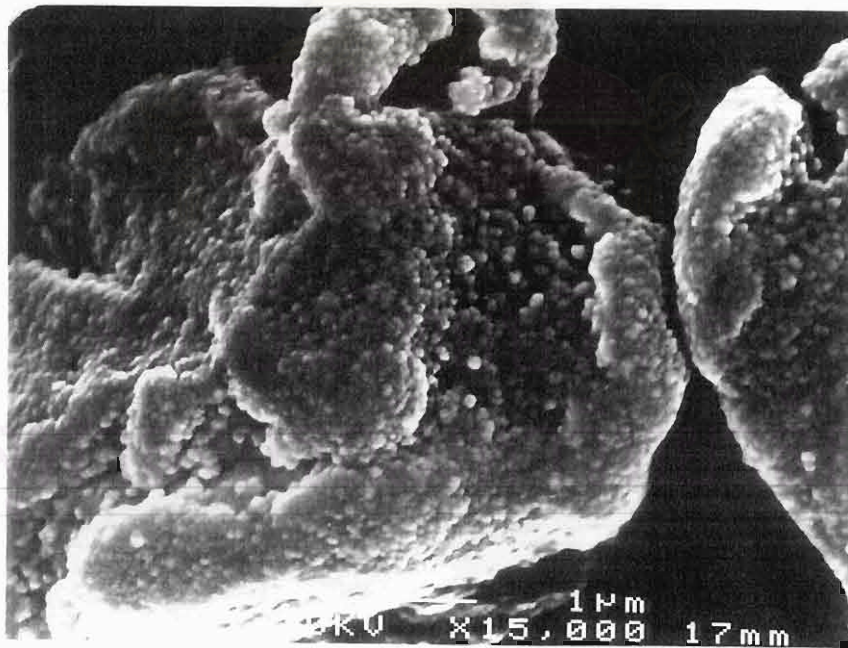


Figure B-28 Typical SEM micrograph of N-09C (x15,000)

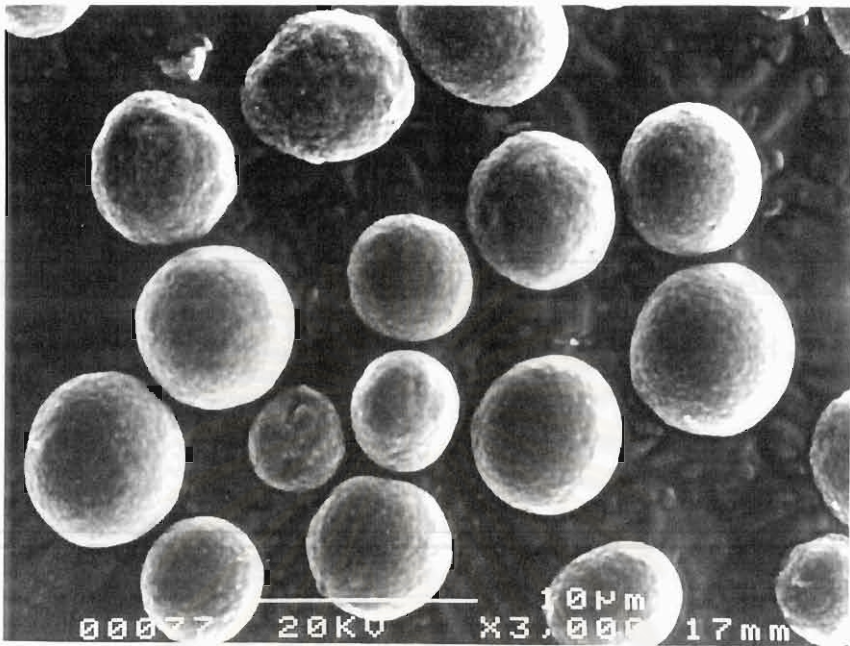


Figure B-29 Typical SEM micrograph of N-09S (x3,000)

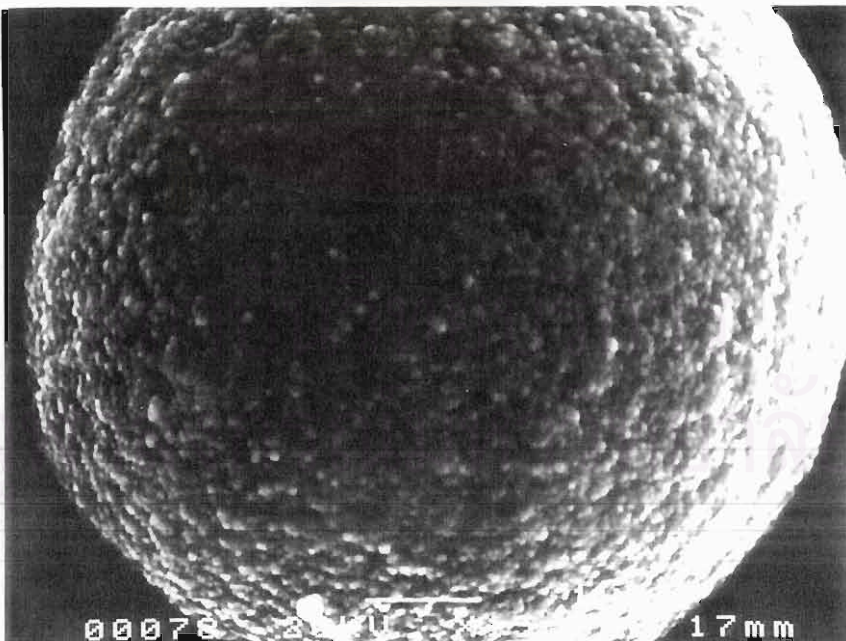


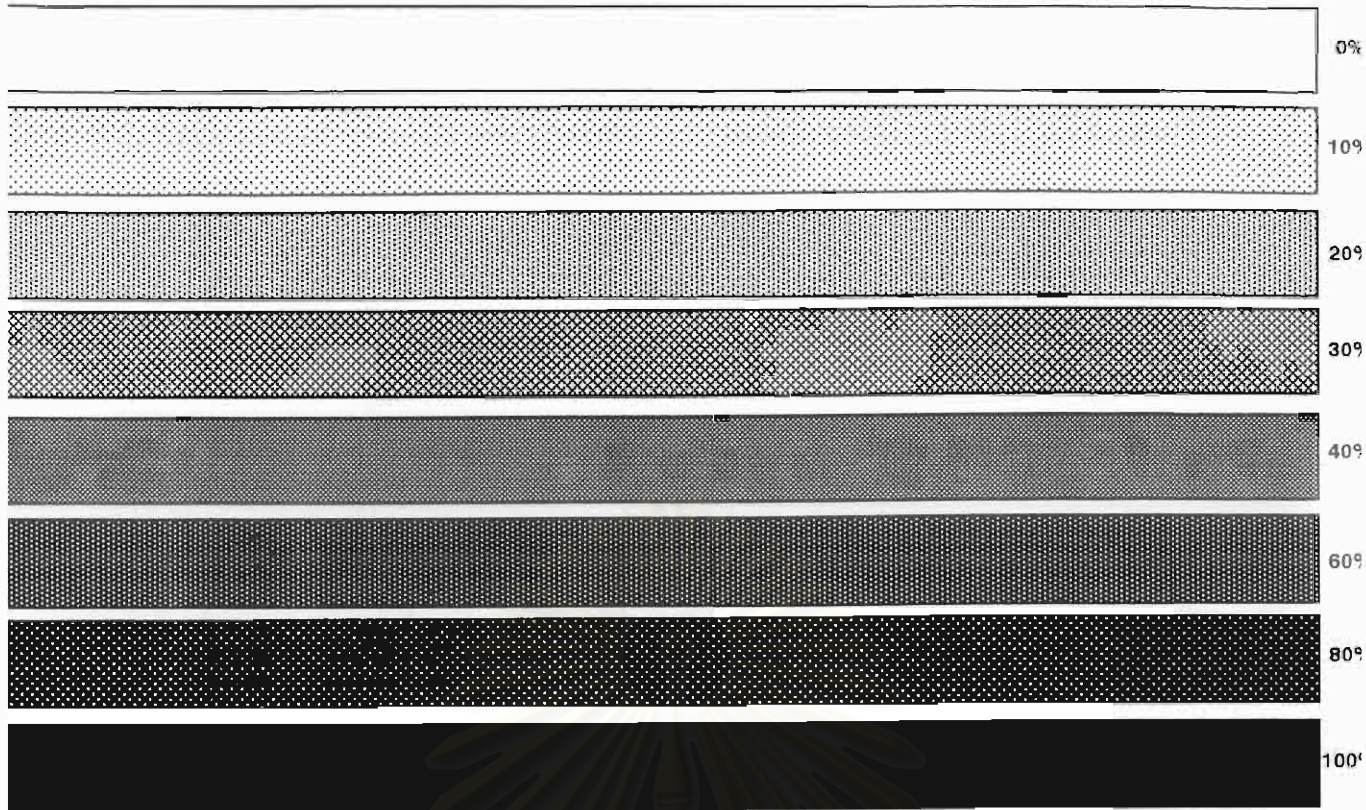
Figure B-30 Typical SEM micrograph of N-09S (x15,000)

APPENDIX C

THE TEST FORM, PRODUCED BY THE FIFTH ALDUS
PAGEMAKER PROGRAM FOR MACINTOSH



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21 721 721 721

21 721 721 721

31V 481V 481V 481V

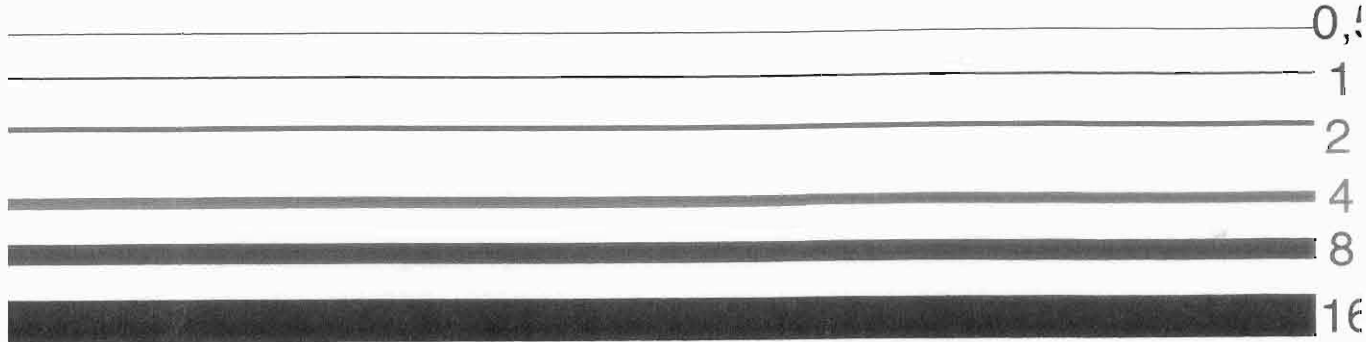
31V 481V 481V 481V

ABCDE 181VABCDE 181VABCDE 181VABCDE

ABCDE 181VABCDE 181VABCDE 181VABCDE

3CDEONMK 121VABCDEONMK 121VABCDEONMK 121VABCDEONMK

CDEONMK 121VABCDEONMK 121VABCDEONMK 121VABCDEONMK





VITA

Miss Chaweewan Poomtien was born on February 6, 1973 in Bangkok, Thailand. She received her B.Sc. degree in Science from the Faculty of Science, Chulalongkorn University in 1995, and she has been a graduate student in the Imaging Technology Program, Graduate school, Chulalongkorn University since 1996.



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