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ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย



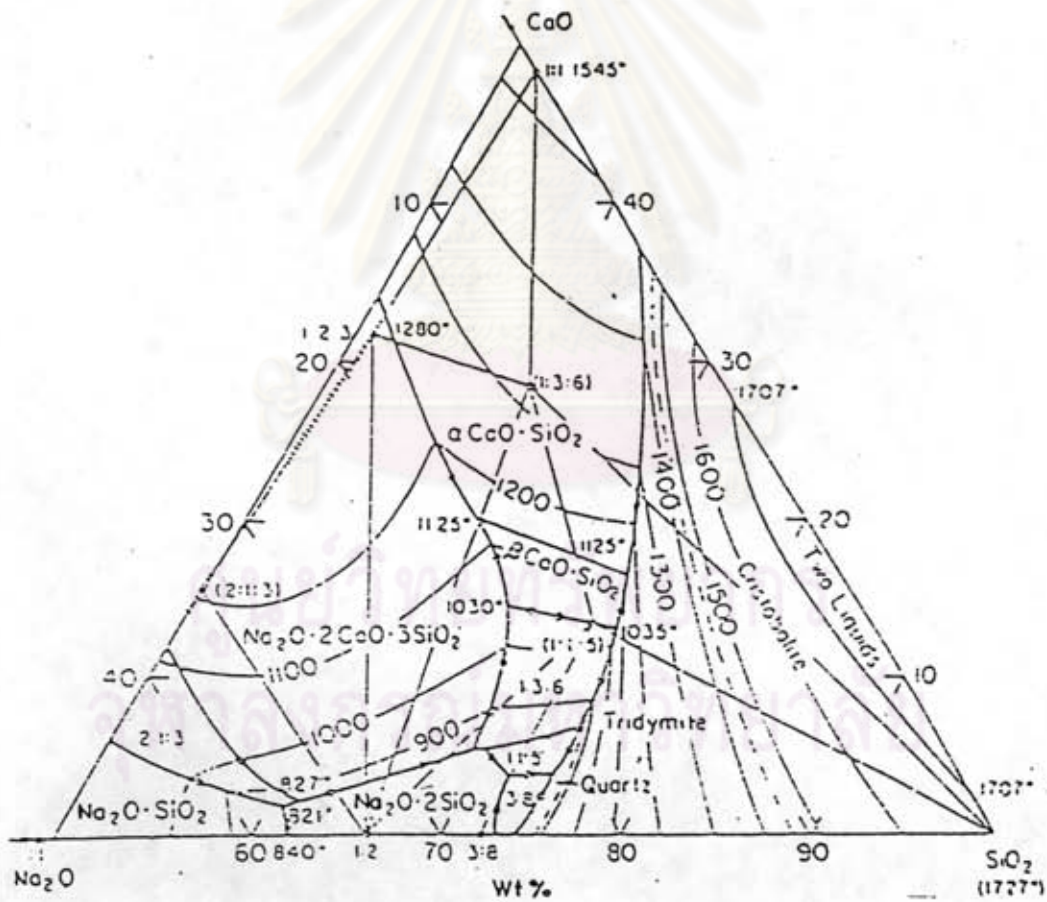
APPENDICES A-C

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย



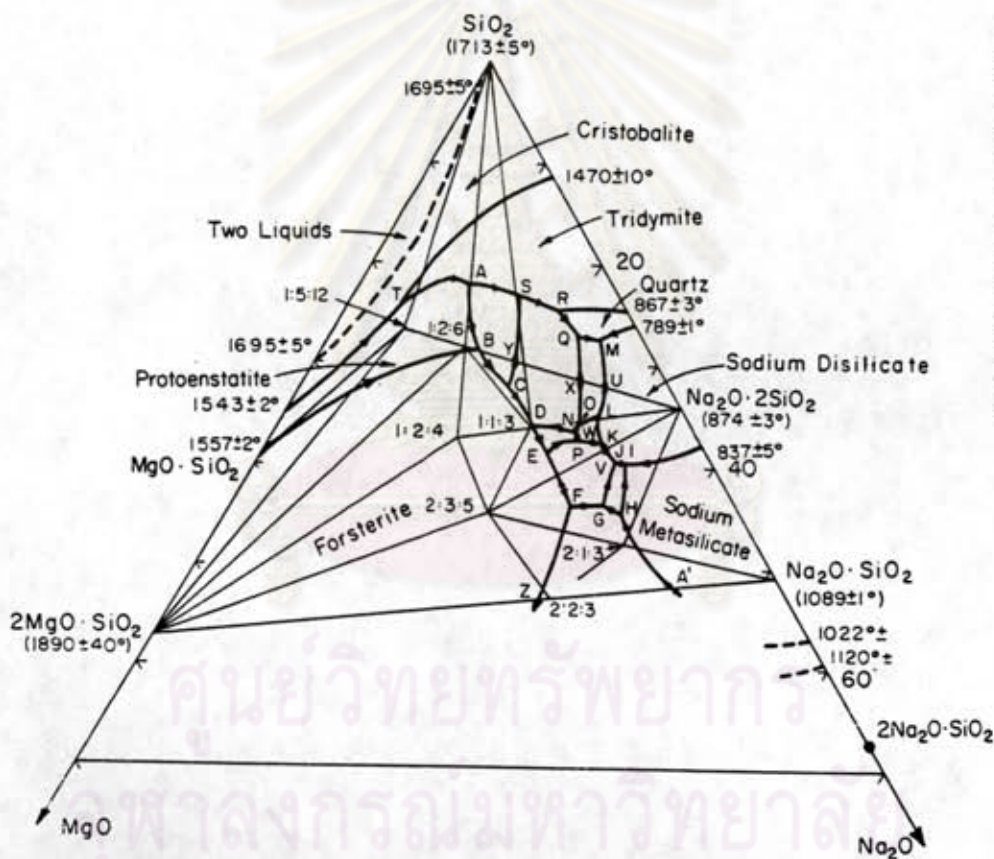
Appendix A

Phase diagram of Na₂O-CaO-SiO₂ system



Appendix B

Phase diagram of Na₂O-MgO-SiO₂ system



A	1250	#	5
B	1190	#	
C	1040	#	
D	915	#	
E	868	#	
F	865	#	10
G	798	#	
H	825	#	
I	735	#	
J	713	#	
K	713	#	
L	733	#	
M	725	#	10
N	785	#	
O	773	#	
P	780	#	
Q	775	#	
R	867	#	
S	1018	#	10
T	1470	#	
U	763	#	
V	716	#	
W	743	#	
X	818	#	
Y	1045	#	5

ศูนย์วิทยทรัพยากร
 ภาควิชาธรณีวิทยา



Appendix C

Raw data of temperature and resistivity tests



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Soda ash (normal size)
Heating rate 10 K/min

Sand (normal size)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
10.75	137.14	33.29	2.97	10.75	254.27	93.93	2.98
12.42	156.81	36.57	2.97	12.42	271.78	107.49	2.96
14.08	174.49	40.98	2.96	14.08	288.20	122.28	2.94
15.75	190.87	47.30	2.96	15.75	303.63	138.10	2.95
17.42	208.75	57.17	2.95	17.42	317.92	153.75	2.94
19.08	223.95	70.62	2.92	19.08	331.54	170.82	2.95
20.75	238.71	86.32	2.85	20.75	346.28	187.39	2.95
22.42	256.99	98.30	2.69	22.42	362.91	205.15	2.95
24.08	272.13	102.82	2.63	24.08	379.38	223.36	2.95
25.75	286.96	103.27	2.66	25.75	396.65	241.59	2.95
27.42	304.23	103.65	2.71	27.42	417.28	259.74	2.96
29.08	320.12	103.78	2.79	29.08	434.79	278.76	2.96
30.75	339.53	104.12	2.85	30.75	454.50	298.68	2.96
32.42	357.84	105.25	2.90	32.42	474.23	318.19	2.97
34.08	373.53	107.95	2.93	34.08	489.91	337.96	2.96
35.75	391.09	116.69	2.96	35.75	505.78	357.73	2.97
37.42	408.73	131.73	2.97	37.42	526.00	377.39	2.96
39.08	424.76	155.16	2.98	39.08	540.66	396.70	2.96
40.75	440.70	182.35	2.99	40.75	548.84	415.71	2.96
42.42	457.18	206.53	2.99	42.42	561.51	434.02	2.97
44.08	473.95	229.12	2.98	44.08	579.22	453.20	2.98
45.75	489.70	250.31	2.98	45.75	597.82	469.56	2.98
47.42	507.25	269.91	2.97	47.42	612.98	485.41	2.98
49.08	524.82	289.05	2.96	49.08	628.47	502.34	2.98
50.75	540.85	307.09	2.94	50.75	645.44	518.61	2.98
52.42	558.01	324.90	2.92	52.42	665.94	533.31	2.97
54.08	574.23	342.72	2.87	54.08	683.03	547.99	2.95
55.75	593.65	360.42	2.81	55.75	700.07	561.73	2.94
57.42	614.75	377.96	2.72	57.42	716.39	579.59	2.92
59.08	631.04	395.97	2.61	59.08	732.27	601.31	2.91
60.75	647.68	413.13	2.46	60.75	747.46	620.91	2.90
62.42	664.88	430.78	2.28	62.42	763.53	641.01	2.90
64.08	681.24	448.04	2.08	64.08	778.76	660.28	2.91
65.75	697.35	467.45	1.88	65.75	795.07	677.64	2.92
67.42	713.78	488.02	1.69	67.42	811.97	694.72	2.92
69.08	730.87	510.12	1.53	69.08	828.33	710.80	2.92
70.75	747.44	531.97	1.37	70.75	845.02	727.47	2.92
72.42	764.56	554.23	1.22	72.42	861.44	745.70	2.93
74.08	781.17	575.40	1.06	74.08	878.01	763.19	2.91
75.75	798.83	596.17	0.90	75.75	894.41	780.61	2.91
77.42	815.01	617.32	0.74	77.42	911.28	799.56	2.89
79.08	831.38	637.50	0.58	79.08	928.21	815.86	2.85
80.75	848.34	657.83	0.44	80.75	945.01	833.26	2.81
82.42	864.99	677.69	0.33	82.42	961.93	849.71	2.76
84.08	881.80	697.31	0.22	84.08	978.31	867.07	2.72
85.75	898.54	716.25	0.14	85.75	995.87	883.13	2.68
87.42	915.31	735.46	0.09	87.42	1012.48	904.32	2.63
89.08	932.67	755.19	0.05	89.08	1030.05	920.93	2.54
90.75	949.69	773.55	0.02	90.75	1047.45	937.91	2.49
92.42	966.45	792.65	-0.04	92.42	1065.01	957.97	2.43

Limestone (normal size)
Heating rate 10 K/min

Dolomite (normal size)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.75	48.56	28.11	2.98	0.75	38.32	26.46	2.95
2.42	70.47	28.50	2.98	2.42	58.03	26.89	2.93
4.08	87.43	29.62	2.98	4.08	80.97	27.58	2.94
5.75	101.67	31.29	2.98	5.75	101.74	28.78	2.93
7.42	114.17	33.75	2.98	7.42	117.30	30.95	2.96
9.08	123.42	36.49	2.97	9.08	126.19	34.34	2.97
10.75	137.31	40.50	2.97	10.75	140.31	38.49	2.99
12.42	156.98	45.18	2.98	12.42	158.45	43.03	2.99
14.08	174.94	51.11	2.98	14.08	174.81	48.83	2.99
15.75	190.36	56.96	2.98	15.75	190.09	55.57	2.98
17.42	207.46	65.41	2.98	17.42	206.36	63.73	2.98
19.08	224.60	74.76	2.98	19.08	221.74	72.47	2.97
20.75	237.63	84.57	2.98	20.75	236.73	82.02	2.98
22.42	255.22	95.35	2.98	22.42	253.68	92.06	2.98
24.08	271.49	107.19	2.98	24.08	273.61	103.42	2.98
25.75	285.70	120.05	2.98	25.75	287.81	115.31	2.98
27.42	302.62	134.02	2.98	27.42	301.32	127.75	2.98
29.08	318.68	147.94	2.98	29.08	318.40	140.83	2.98
30.75	335.55	162.75	2.98	30.75	332.30	155.23	2.98
32.42	353.45	177.88	2.98	32.42	351.74	169.47	2.98
34.08	371.82	194.41	2.98	34.08	367.82	184.35	2.98
35.75	388.02	210.70	2.98	35.75	384.41	200.28	2.98
37.42	402.02	228.19	2.98	37.42	399.96	216.06	2.98
39.08	420.35	246.26	2.99	39.08	417.71	232.98	2.98
40.75	438.88	263.74	2.99	40.75	436.32	249.78	2.98
42.42	455.06	281.48	2.99	42.42	458.06	266.46	2.98
44.08	472.40	299.42	2.99	44.08	478.97	284.43	2.98
45.75	490.17	319.04	3.00	45.75	499.38	302.78	2.98
47.42	512.95	337.69	2.99	47.42	518.65	321.48	2.98
49.08	530.24	357.30	2.99	49.08	533.45	340.01	2.99
50.75	544.09	377.62	2.99	50.75	551.87	359.02	2.97
52.42	562.81	398.55	2.99	52.42	565.37	378.12	2.97
54.08	580.02	417.36	2.99	54.08	583.44	396.58	2.97
55.75	596.84	435.99	2.99	55.75	599.74	415.02	2.97
57.42	614.45	453.46	2.99	57.42	615.61	433.64	2.97
59.08	631.20	470.48	2.97	59.08	632.26	451.97	2.98
60.75	646.11	487.02	2.97	60.75	647.43	470.25	2.98
62.42	664.36	504.79	2.98	62.42	664.49	488.87	2.98
64.08	680.58	521.60	2.98	64.08	680.99	506.00	2.99
65.75	697.00	539.58	2.96	65.75	699.92	524.52	2.99
67.42	714.89	555.83	2.95	67.42	716.48	541.97	2.99
69.08	734.61	572.75	2.96	69.08	732.59	559.09	2.99
70.75	751.13	591.05	2.96	70.75	749.87	576.79	2.98
72.42	767.98	608.45	2.96	72.42	765.67	595.35	2.97
74.08	784.82	626.41	2.95	74.08	781.41	613.69	2.96
75.75	801.41	643.45	2.95	75.75	797.77	631.33	2.96
77.42	817.60	662.02	2.93	77.42	814.52	648.24	2.96
79.08	833.97	679.74	2.91	79.08	831.62	663.39	2.97
80.75	850.57	697.13	2.90	80.75	847.31	679.67	2.97
82.42	867.70	714.15	2.89	82.42	863.85	691.23	2.96

Soda-sand (big size)
Heating rate 10 K/min

Soda-sand (medium size)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.75	45.11	28.77	3.00	0.75	108.73	29.63	2.97
2.42	89.35	28.67	3.00	2.42	154.12	31.05	2.96
4.08	132.30	27.17	2.99	4.08	186.14	34.23	2.96
5.75	168.70	23.69	2.99	5.75	213.14	44.47	2.95
7.42	199.29	33.62	2.99	7.42	236.52	62.41	2.85
9.08	225.24	57.29	2.95	9.08	257.15	84.84	2.56
10.75	248.48	80.95	2.73	10.75	276.02	98.75	2.27
12.42	268.80	99.23	2.26	12.42	292.96	101.28	2.40
14.08	287.85	101.89	2.32	14.08	309.11	101.58	2.57
15.75	305.67	101.95	2.41	15.75	324.13	101.35	2.77
17.42	322.72	102.68	2.54	17.42	338.67	102.71	2.89
19.08	338.63	105.35	2.77	19.08	354.46	114.06	2.94
20.75	353.68	114.35	2.88	20.75	400.43	145.04	2.95
22.42	367.38	134.64	2.93	22.42	453.07	174.44	2.95
24.08	397.88	164.61	2.96	24.08	496.14	200.23	2.95
25.75	452.25	193.15	2.98	25.75	532.36	227.13	2.95
27.42	497.90	220.74	2.98	27.42	565.12	255.72	2.95
29.08	536.20	248.92	2.96	29.08	596.35	285.14	2.97
30.75	570.17	277.60	2.97	30.75	624.82	314.73	2.95
32.42	601.14	308.22	2.96	32.42	650.82	344.88	2.91
34.08	628.90	339.14	2.92	34.08	674.17	375.68	2.84
35.75	654.60	370.14	2.84	35.75	695.44	407.02	2.72
37.42	678.11	401.61	2.72	37.42	715.13	436.62	2.55
39.08	699.73	431.58	2.53	39.08	733.86	467.75	2.33
40.75	719.61	462.28	2.31	40.75	751.99	498.12	2.09
42.42	739.33	494.05	2.08	42.42	769.22	528.68	1.84
44.08	758.84	524.95	1.83	44.08	785.91	557.27	1.60
45.75	777.34	554.05	1.58	45.75	801.73	586.71	1.39
47.42	795.12	583.19	1.34	47.42	816.74	615.48	1.23
49.08	812.90	611.76	1.14	49.08	831.21	642.57	1.11
50.75	829.50	639.61	0.97	50.75	844.92	667.30	1.01
52.42	845.39	666.18	0.81	52.42	858.15	690.46	0.89
54.08	859.77	690.57	0.64	54.08	870.83	712.76	0.73
55.75	873.66	712.62	0.48	55.75	883.54	733.28	0.56
57.42	886.00	733.57	0.34	57.42	895.46	752.83	0.39
59.08	897.16	753.39	0.23	59.08	906.90	770.85	0.21
60.75	908.82	771.93	0.14	60.75	917.21	788.91	0.11
62.42	919.64	788.71	0.08	62.42	926.95	803.12	0.07
64.08	930.22	801.52	0.05	64.08	936.76	814.65	0.06
65.75	940.58	811.08	0.04	65.75	946.32	820.90	0.05
67.42	950.19	818.45	0.03	67.42	955.26	826.26	0.05
69.08	959.56	822.22	0.03	69.08	963.89	829.09	0.04
70.75	969.01	822.28	0.03	70.75	972.21	832.06	0.03
72.42	977.57	825.16	0.02	72.42	980.14	833.60	0.01
74.08	986.07	826.45	0.01	74.08	988.48	834.66	-0.06
75.75	996.29	826.43	0.00	75.75	997.20	839.03	-0.15
77.42	1003.38	825.75	-0.01	77.42	1006.12	841.89	-0.14
79.08	1013.16	825.82	0.01	79.08	1014.12	842.70	-0.06
80.75	1020.78	828.64	0.08	80.75	1018.48	845.00	-0.02
82.42	1028.27	834.99	0.08	82.42	1028.30	847.19	-0.01

Soda-sand (small size)
Heating rate 10 K/min

Soda-sand (flint)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
9.08	112.96	32.25	2.95	9.08	220.26	62.93	2.93
10.75	128.08	36.03	2.96	10.75	241.18	87.28	2.94
12.42	145.51	39.95	2.96	12.42	245.23	102.99	2.03
14.08	162.74	45.04	2.96	14.08	256.76	104.89	1.87
15.75	179.75	51.64	2.95	15.75	275.89	104.67	2.20
17.42	197.54	61.49	2.91	17.42	294.30	105.83	2.50
19.08	213.61	76.62	2.76	19.08	310.57	108.34	2.76
20.75	229.76	92.37	2.38	20.75	329.25	112.83	2.88
22.42	248.25	101.52	2.11	22.42	376.45	123.18	2.93
24.08	264.60	103.55	2.29	24.08	428.90	143.15	2.95
25.75	280.01	103.64	2.53	25.75	473.85	173.91	2.95
27.42	297.82	103.39	2.80	27.42	511.55	205.42	2.95
29.08	314.89	103.69	2.91	29.08	545.28	235.05	2.95
30.75	330.45	105.22	2.94	30.75	576.63	264.47	2.95
32.42	345.85	116.86	2.94	32.42	605.32	294.03	2.95
34.08	356.51	145.41	2.94	34.08	631.44	323.28	2.94
35.75	371.04	171.01	2.93	35.75	655.58	351.60	2.93
37.42	393.63	194.01	2.93	37.42	677.51	380.18	2.92
39.08	418.31	214.88	2.92	39.08	697.66	408.44	2.91
40.75	436.11	234.76	2.91	40.75	716.39	435.99	2.90
42.42	455.24	255.23	2.92	42.42	734.44	463.72	2.88
44.08	474.35	275.80	2.92	44.08	751.39	492.27	2.82
45.75	493.26	296.91	2.92	45.75	767.59	519.94	2.77
47.42	514.22	317.50	2.93	47.42	783.52	547.93	2.70
49.08	512.14	337.43	2.94	49.08	798.55	573.70	2.63
50.75	554.40	357.07	2.93	50.75	812.94	600.30	2.58
52.42	589.53	375.58	2.91	52.42	826.53	626.58	2.53
54.08	611.06	394.86	2.86	54.08	839.70	650.99	2.51
55.75	627.14	413.65	2.79	55.75	851.58	673.98	2.51
57.42	650.25	435.07	2.69	57.42	862.61	696.26	2.49
59.08	663.94	455.89	2.55	59.08	873.70	716.73	2.40
60.75	684.65	477.31	2.38	60.75	884.26	734.72	2.16
62.42	703.02	499.44	2.20	62.42	894.18	751.44	1.65
64.08	724.76	521.32	2.01	64.08	903.51	765.73	1.17
65.75	744.03	542.62	1.81	65.75	912.51	777.65	0.81
67.42	761.30	561.59	1.61	67.42	921.22	786.42	0.52
69.08	779.34	583.97	1.44	69.08	929.90	795.14	0.31
70.75	797.19	606.52	1.30	70.75	938.50	801.71	0.18
72.42	814.53	628.94	1.21	72.42	946.89	806.95	0.10
74.08	831.43	651.43	1.15	74.08	954.85	812.70	0.06
75.75	849.25	673.12	1.08	75.75	962.31	817.03	0.05
77.42	866.68	695.03	0.95	77.42	970.61	821.47	0.04
79.08	883.55	716.02	0.77	79.08	978.57	825.90	0.05
80.75	896.60	737.05	0.56	80.75	984.55	831.14	0.08
82.42	913.62	754.88	0.35	82.42	992.51	836.02	0.08
84.08	932.61	772.74	0.17	84.08	1000.65	840.23	0.05
85.75	950.95	788.20	0.08	85.75	1009.03	843.84	0.06
87.42	969.57	802.05	0.04	87.42	1015.55	852.51	0.05
89.08	989.05	811.81	0.03	89.08	1022.35	867.11	0.01
90.75	1008.12	818.55	0.00	90.75	1030.94	889.24	0.03

Soda-lime (big size)
Heating rate 10 K/min

Soda-lime (medium size)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.75	48.97	28.40	2.99	0.75	96.96	41.22	2.96
2.42	92.79	28.25	2.98	2.42	133.50	43.40	2.96
4.08	133.34	29.57	2.99	4.08	163.97	47.76	2.95
5.75	167.67	33.83	3.00	5.75	189.45	56.90	2.94
7.42	196.16	41.79	2.99	7.42	212.82	72.10	2.88
9.08	220.85	55.50	2.97	9.08	233.10	89.73	2.66
10.75	242.39	75.91	2.82	10.75	252.48	99.63	2.58
12.42	262.03	97.21	2.19	12.42	268.99	101.17	2.66
14.08	280.08	102.12	2.19	14.08	260.63	102.01	2.75
15.75	296.94	101.99	2.36	15.75	245.28	101.67	2.86
17.42	313.28	102.67	2.50	17.42	232.38	102.89	2.92
19.08	329.22	106.46	2.67	19.08	223.36	108.54	2.94
20.75	344.44	118.87	2.89	20.75	227.28	118.60	2.95
22.42	370.68	135.52	2.98	22.42	293.63	135.48	2.97
24.08	424.13	160.87	3.02	24.08	358.86	152.70	2.97
25.75	472.12	188.17	3.02	25.75	415.79	166.67	2.97
27.42	512.36	215.66	3.02	27.42	461.68	183.45	2.97
29.08	547.54	243.72	3.02	29.08	502.87	204.32	2.97
30.75	578.93	272.73	3.01	30.75	541.18	227.19	2.97
32.42	608.15	302.96	2.94	32.42	574.63	252.80	2.95
34.08	634.95	333.54	2.73	34.08	604.31	281.05	2.94
35.75	660.12	364.18	2.35	35.75	631.50	309.83	2.91
37.42	683.29	393.88	1.84	37.42	657.04	338.95	2.84
39.08	705.04	424.45	1.36	39.08	680.72	369.39	2.65
40.75	725.11	451.87	0.99	40.75	702.12	400.05	2.34
42.42	743.50	482.41	0.74	42.42	722.06	429.81	1.97
44.08	760.17	513.25	0.58	44.08	740.65	460.37	1.63
45.75	775.41	541.62	0.45	45.75	760.31	492.45	1.37
47.42	790.02	568.50	0.37	47.42	778.84	523.77	1.15
49.08	804.10	594.33	0.30	49.08	795.36	554.12	0.96
50.75	818.26	617.88	0.25	50.75	811.53	581.35	0.80
52.42	832.05	640.36	0.21	52.42	827.30	606.98	0.65
54.08	845.16	661.69	0.18	54.08	841.91	631.44	0.54
55.75	857.47	681.50	0.15	55.75	855.92	654.48	0.45
57.42	869.17	698.37	0.13	57.42	868.48	675.71	0.39
59.08	880.44	714.89	0.11	59.08	880.43	693.69	0.32
60.75	890.99	731.21	0.07	60.75	892.80	713.78	0.23
62.42	900.47	747.03	0.01	62.42	905.01	736.49	0.03
64.08	908.68	757.17	0.00	64.08	914.90	757.91	-0.03
65.75	916.06	758.68	0.03	65.75	924.00	770.39	0.01
67.42	923.22	775.52	0.02	67.42	931.70	775.58	0.00
69.08	929.73	801.83	0.03	69.08	939.32	813.42	0.00
70.75	939.26	824.82	0.01	70.75	949.25	837.75	0.00
72.42	948.65	848.21	0.01	72.42	960.87	841.00	-0.02
74.08	958.34	864.14	0.01	74.08	973.08	850.58	-0.02
75.75	967.54	884.85	0.02	75.75	982.54	859.15	-0.02
77.42	976.09	905.19	0.02	77.42	994.20	871.19	-0.02
79.08	986.04	941.33	0.00	79.08	1003.76	889.07	0.02
80.75	994.38	940.77	0.00	80.75	1014.49	900.83	0.00
82.42	1002.58	945.55	0.01	82.42	1024.81	906.46	0.00



Soda-lime (small size)
Heating rate 10 K/min

Soda-dolo (big size)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.75	85.82	31.04	3.00	0.75	47.57	28.04	2.99
2.42	130.37	31.90	2.97	2.42	95.72	28.52	2.99
4.08	169.50	34.27	2.94	4.08	138.88	29.50	2.94
5.75	200.96	39.51	2.93	5.75	173.94	32.25	2.95
7.42	227.55	50.70	2.90	7.42	203.13	38.52	2.94
9.08	249.82	67.78	2.81	9.08	227.77	49.53	2.92
10.75	269.28	86.92	2.39	10.75	249.56	66.63	2.88
12.42	287.54	99.68	2.07	12.42	268.82	88.92	2.66
14.08	304.96	102.40	2.26	14.08	286.36	101.68	2.39
15.75	321.32	104.11	2.45	15.75	302.63	102.99	2.51
17.42	336.01	107.12	2.68	17.42	317.94	103.46	2.65
19.08	351.51	117.62	2.83	19.08	332.18	104.45	2.80
20.75	396.66	132.03	2.91	20.75	346.02	108.46	2.90
22.42	452.17	153.79	2.96	22.42	359.88	118.78	2.95
24.08	497.51	181.85	2.97	24.08	398.79	139.18	2.97
25.75	536.03	210.77	2.97	25.75	454.14	167.88	2.97
27.42	569.73	241.21	2.98	27.42	499.04	195.05	2.98
29.08	601.24	271.04	2.97	29.08	536.16	222.33	2.98
30.75	631.08	301.45	2.95	30.75	569.17	250.93	2.96
32.42	656.87	332.41	2.89	32.42	596.71	278.98	2.92
34.08	680.52	363.89	2.76	34.08	621.73	308.79	2.89
35.75	702.42	394.79	2.49	35.75	645.40	337.04	2.76
37.42	722.46	424.69	2.09	37.42	667.32	366.10	2.50
39.08	742.35	454.99	1.68	39.08	687.04	396.09	2.11
40.75	761.23	485.29	1.34	40.75	706.29	424.23	1.67
42.42	778.77	516.79	1.07	42.42	724.46	452.16	1.30
44.08	795.40	548.23	0.87	44.08	742.01	481.64	1.02
45.75	811.23	575.87	0.70	45.75	759.30	511.02	0.84
47.42	826.64	602.91	0.59	47.42	775.67	539.19	0.72
49.08	841.10	627.99	0.43	49.08	791.02	565.59	0.63
50.75	854.72	651.36	0.33	50.75	806.26	590.01	0.56
52.42	867.36	673.38	0.28	52.42	820.54	613.02	0.52
54.08	879.06	692.49	0.25	54.08	833.97	633.35	0.50
55.75	890.05	711.29	0.13	55.75	846.61	650.63	0.49
57.42	900.73	733.86	0.08	57.42	858.30	663.24	0.48
59.08	911.23	758.36	0.02	59.08	869.78	673.16	0.45
60.75	920.13	781.13	-0.03	60.75	881.31	679.11	0.41
62.42	927.15	779.34	-0.05	62.42	892.36	685.85	0.38
64.08	935.40	799.25	-0.02	64.08	903.00	690.80	0.35
65.75	943.97	839.61	-0.04	65.75	912.80	696.13	0.32
67.42	953.35	858.81	-0.01	67.42	922.09	701.06	0.28
69.08	962.79	889.90	-0.01	69.08	931.27	708.54	0.29
70.75	971.40	930.39	-0.02	70.75	940.59	715.76	0.37
72.42	980.59	942.68	-0.01	72.42	950.36	724.15	0.28
74.08	989.55	960.79	-0.01	74.08	959.59	738.38	0.05
75.58	997.82	982.91	-0.01	75.75	969.22	759.64	0.00

Soda-dolo (medium size)
Heating rate 10 K/min

Soda-dolo (small size)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.75	46.85	28.79	2.98	0.75	42.57	29.65	2.92
2.42	89.35	28.32	2.98	2.42	84.17	29.97	2.92
4.08	130.17	28.76	2.98	4.08	125.27	30.48	2.94
5.75	164.67	31.25	2.98	5.75	160.78	32.94	2.94
7.42	193.82	36.93	2.97	7.42	190.31	38.39	2.93
9.08	219.29	48.68	2.95	9.08	215.61	49.94	2.90
10.75	241.75	69.88	2.76	10.75	238.50	67.69	2.82
12.42	261.53	92.39	2.23	12.42	259.15	85.90	2.46
14.08	279.47	100.69	2.22	14.08	278.50	96.78	2.35
15.75	296.75	101.47	2.35	15.75	297.05	99.00	2.51
17.42	313.93	101.45	2.47	17.42	314.11	100.77	2.67
19.08	329.09	101.23	2.63	19.08	330.01	103.36	2.83
20.75	343.01	102.45	2.86	20.75	348.16	111.80	2.92
22.42	362.23	106.29	2.95	22.42	396.16	126.95	2.97
24.08	410.45	127.07	2.98	24.08	448.10	150.23	2.99
25.75	459.96	160.40	2.99	25.75	491.94	179.01	2.99
27.42	502.26	188.86	2.99	27.42	528.33	207.55	2.97
29.08	538.43	216.87	2.99	29.08	560.94	236.59	2.97
30.75	569.79	245.62	2.99	30.75	591.04	266.66	2.97
32.42	598.18	276.43	2.98	32.42	618.08	297.70	2.94
34.08	624.60	304.76	2.92	34.08	643.36	328.26	2.85
35.75	648.69	332.86	2.75	35.75	666.49	358.44	2.60
37.42	671.53	363.29	2.38	37.42	688.31	389.01	2.21
39.08	692.84	393.04	1.87	39.08	708.50	418.76	1.79
40.75	712.46	421.03	1.39	40.75	726.82	448.09	1.46
42.42	730.85	449.52	1.05	42.42	745.30	477.55	1.23
44.08	748.03	482.61	0.84	44.08	762.60	507.99	1.06
45.75	765.24	513.48	0.70	45.75	778.07	535.88	0.95
47.42	781.19	542.46	0.62	47.42	790.95	561.43	0.87
49.08	796.30	568.61	0.56	49.08	804.49	584.22	0.84
50.75	810.35	589.91	0.54	50.75	817.08	604.77	0.84
52.42	823.80	609.14	0.56	52.42	829.62	620.27	0.87
54.08	836.53	620.45	0.58	54.08	841.29	632.47	0.91
55.75	848.53	632.06	0.59	55.75	853.26	640.58	0.94
57.42	860.84	644.55	0.59	57.42	864.10	646.25	0.97
59.08	872.37	651.34	0.58	59.08	874.87	649.96	0.94
60.75	882.74	649.82	0.55	60.75	884.93	654.47	0.89
62.42	892.32	652.67	0.50	62.42	895.21	658.35	0.84
64.08	902.09	658.77	0.44	64.08	904.97	667.46	0.77
65.75	911.03	674.77	0.50	65.75	913.70	680.55	0.60
67.42	920.43	688.53	0.47	67.42	922.74	700.15	0.14
69.08	930.11	705.15	0.20	69.08	931.03	729.18	-0.05
70.75	939.76	721.73	0.02	70.75	939.86	764.13	-0.09
72.42	948.84	745.17	0.01	72.42	949.09	785.19	-0.11
74.08	958.11	767.96	-0.03	74.08	958.93	813.16	-0.09
75.75	967.77	803.77	-0.05	75.75	970.33	849.69	-0.08
77.42	977.39	852.90	-0.06	77.42	976.32	879.50	-0.07
79.08	987.21	883.96	-0.04	79.08	985.40	900.84	-0.05
80.75	995.53	912.23	0.00	80.75	994.26	921.45	-0.04
82.42	1005.64	923.72	-0.02	82.42	1003.30	933.32	-0.02

Cullet-soda (normal size)
Heating rate 10 K/min

Cullet (small size)
Heating rate 10 K/min

Time (min)	atm-T (C)	batch-T (C)	Ux (V)	Time (min)	atm-T (C)	batch-T (C)	Ux (V)
12.42	145.79	63.74	2.97	12.42	136.34	45.85	2.89
14.08	162.74	67.19	2.96	14.08	152.06	53.32	2.85
15.75	179.25	72.13	2.98	15.75	167.68	61.45	2.83
17.42	194.63	78.46	2.97	17.42	182.38	68.75	2.84
19.08	210.73	85.64	2.97	19.08	197.29	77.40	2.86
20.75	225.37	94.31	2.97	20.75	212.05	86.43	2.90
22.42	239.35	103.84	2.97	22.42	227.99	96.87	2.96
24.08	254.31	114.74	2.98	24.08	242.91	110.42	2.96
25.75	269.22	126.26	2.98	25.75	258.28	123.72	2.97
27.42	284.84	138.82	2.98	27.42	274.93	137.39	2.97
29.08	299.31	151.71	2.97	29.08	299.36	151.91	2.97
30.75	325.72	165.06	2.98	30.75	315.07	167.31	2.98
32.42	343.91	179.21	2.98	32.42	331.55	183.24	2.98
34.08	358.71	195.31	2.98	34.08	348.86	199.82	2.99
35.75	376.29	212.42	2.98	35.75	364.43	216.70	3.00
37.42	395.62	230.19	2.99	37.42	381.42	234.57	3.00
39.08	412.45	248.07	2.98	39.08	397.52	252.03	3.00
40.75	427.82	266.55	2.99	40.75	413.67	242.86	2.98
42.42	445.79	285.87	2.99	42.42	431.83	289.35	2.96
44.08	461.34	305.13	2.97	44.08	449.55	306.32	2.95
45.75	476.32	324.96	2.96	45.75	467.61	324.30	2.96
47.42	493.49	344.35	2.95	47.42	485.31	341.62	2.96
49.08	510.92	363.60	2.93	49.08	501.83	358.69	2.96
50.75	527.17	382.98	2.92	50.75	519.81	376.19	2.96
52.42	543.80	401.90	2.89	52.42	537.64	394.16	2.96
54.08	559.57	421.95	2.85	54.08	555.53	411.63	2.96
55.75	575.57	441.29	2.80	55.75	573.99	428.53	2.95
57.42	592.61	461.47	2.74	57.42	590.34	446.15	2.94
59.08	609.49	481.70	2.68	59.08	608.29	463.43	2.93
60.75	627.06	501.55	2.60	60.75	626.09	481.76	2.92
62.42	645.04	519.75	2.53	62.42	642.66	499.43	2.89
64.08	661.70	539.12	2.44	64.08	660.24	515.73	2.88
65.75	680.01	556.19	2.35	65.75	677.88	531.62	2.83
67.42	698.19	571.52	2.23	67.42	697.30	546.36	2.78
69.08	715.94	587.26	2.10	69.08	717.99	560.82	2.70
70.75	734.11	603.64	1.94	70.75	737.35	575.06	2.55
72.42	753.21	621.99	1.74	72.42	754.43	590.01	2.34
74.08	774.31	640.02	1.47	74.08	771.63	605.64	1.99
75.75	792.72	658.64	1.21	75.75	789.14	623.70	1.37
77.42	813.49	676.71	0.97	77.42	806.55	646.43	0.55
79.08	830.19	695.07	0.76	79.08	824.30	675.65	0.19
80.75	847.06	714.65	0.59	80.75	841.38	708.18	0.08
82.42	862.77	734.10	0.46	82.42	857.03	736.36	0.02
84.08	879.56	752.80	0.35	84.08	871.03	757.69	0.01
85.75	895.14	771.35	0.26	85.75	885.64	774.86	0.00
87.42	910.25	789.44	0.16	87.42	899.72	792.16	0.05
89.08	923.05	808.64	0.08	89.08	912.35	809.32	0.07
90.75	933.74	825.55	0.12	90.75	923.98	823.59	0.06
92.42	944.17	837.24	0.08	92.42	936.33	836.14	-0.01
94.08	955.34	841.52	0.01	94.08	947.67	850.10	-0.01

Cullet (big size)--> (>5mm)
Heating rate 10 K/min

Cullet (medium size)--> (>2mm)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
17.42	191.87	66.72	2.96	0.75	69.70	29.64	2.98
19.08	205.23	76.48	2.96	2.42	90.33	31.00	2.96
20.75	220.52	87.90	2.97	4.08	107.36	31.67	2.95
22.42	235.86	99.50	2.96	5.75	120.58	34.30	2.94
24.08	249.44	112.03	2.97	7.42	132.29	36.62	2.95
25.75	263.98	125.77	2.98	9.08	142.52	40.36	2.97
27.42	280.49	140.46	2.98	10.75	152.42	44.69	2.95
29.08	304.09	155.61	2.97	12.42	163.24	50.64	2.92
30.75	321.24	171.14	2.98	14.08	172.55	56.86	2.93
32.42	336.96	188.99	2.97	15.75	185.90	63.68	2.92
34.08	353.81	206.47	2.96	17.42	204.52	70.98	2.93
35.75	368.84	225.96	2.96	19.08	224.56	79.44	2.93
37.42	385.58	245.03	2.96	20.75	240.74	89.14	2.93
39.08	401.42	263.82	2.96	22.42	256.97	99.17	2.93
40.75	416.43	283.67	2.96	24.08	272.90	110.55	2.94
42.42	431.47	304.11	2.96	25.75	290.51	121.78	2.94
44.08	449.88	324.01	2.96	27.42	307.51	135.38	2.95
45.75	468.79	344.59	2.96	29.08	324.30	148.88	2.94
47.42	487.02	364.12	2.98	30.75	342.50	164.02	2.94
49.08	503.54	384.55	2.98	32.42	358.86	180.19	2.93
50.75	520.82	404.54	2.98	34.08	375.20	196.79	2.93
52.42	538.46	424.32	2.97	35.75	391.69	213.91	2.92
54.08	555.60	443.56	2.97	37.42	407.35	231.23	2.92
55.75	573.08	463.14	2.97	39.08	422.73	249.28	2.92
57.42	591.09	483.70	2.97	40.75	438.82	268.49	2.93
59.08	608.54	503.13	2.97	42.42	454.14	287.84	2.94
60.75	627.18	523.20	2.96	44.08	472.42	307.27	2.94
62.42	644.54	541.11	2.96	45.75	492.13	327.66	2.93
64.08	662.17	558.33	2.93	47.42	514.21	347.70	2.93
65.75	679.82	573.91	2.90	49.08	530.90	369.18	2.93
67.42	697.61	590.48	2.83	50.75	545.51	391.15	2.93
69.08	719.40	607.42	2.70	52.42	562.58	412.04	2.93
70.75	739.48	625.10	2.47	54.08	580.31	433.60	2.92
72.42	758.21	642.22	2.15	55.75	597.38	455.60	2.92
74.08	775.83	661.06	1.78	57.42	614.23	476.83	2.92
75.75	792.42	680.46	1.39	59.08	631.27	498.00	2.91
77.42	809.85	698.51	1.12	60.75	647.69	519.32	2.90
79.08	826.27	716.11	0.88	62.42	665.25	538.94	2.88
80.75	843.37	734.02	0.59	64.08	682.09	557.53	2.83
82.42	858.88	752.48	0.51	65.75	699.27	573.52	2.75
84.08	873.18	770.24	0.37	67.42	715.63	589.81	2.61
85.75	886.97	787.93	0.21	69.08	731.59	607.21	2.37
87.42	900.00	804.22	0.16	70.75	749.27	625.73	1.99
89.08	911.25	820.81	0.15	72.42	766.85	643.98	1.47
90.75	922.93	832.98	0.18	74.08	783.79	663.49	0.95
92.42	935.13	846.06	0.18	75.75	800.15	682.35	0.54
94.08	946.63	857.30	0.17	77.42	816.64	702.00	0.30
95.75	957.33	871.79	0.12	79.08	832.67	721.04	0.15
97.42	971.18	886.80	0.10	80.75	849.05	740.35	0.08
99.08	992.33	898.30	0.00	90.75	950.03	856.77	0.01

Cullet-dolo (normal size)
Heating rate 10 K/min

Cullet-lime (normal size)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
9.08	105.51	40.56	2.95	9.08	114.62	56.02	2.95
10.75	123.36	43.78	2.95	10.75	131.09	57.67	2.96
12.42	142.02	47.73	2.95	12.42	148.12	60.45	2.96
14.08	158.52	53.58	2.95	14.08	164.18	64.43	2.96
15.75	173.45	58.93	2.96	15.75	179.56	69.12	2.96
17.42	188.94	66.53	2.95	17.42	195.64	75.10	2.97
19.08	203.96	74.95	2.96	19.08	210.19	82.78	2.96
20.75	220.39	84.90	2.95	20.75	223.86	91.22	2.96
22.42	235.31	95.79	2.96	22.42	238.51	101.18	2.95
24.08	250.35	107.57	2.95	24.08	252.83	111.65	2.96
25.75	266.30	120.29	2.95	25.75	278.50	123.14	2.96
27.42	281.50	133.83	2.96	27.42	297.58	135.05	2.97
29.08	298.57	148.15	2.95	29.08	312.09	148.65	2.98
30.75	321.62	162.79	2.95	30.75	328.86	163.55	2.97
32.42	337.30	178.90	2.96	32.42	342.55	179.28	2.97
34.08	351.07	196.40	2.96	34.08	360.12	196.28	2.97
35.75	367.77	213.80	2.96	35.75	374.05	213.82	2.97
37.42	384.76	231.67	2.96	37.42	391.89	232.27	2.97
39.08	402.47	250.66	2.96	39.08	407.76	250.99	2.96
40.75	420.59	269.07	2.96	40.75	421.46	270.03	2.96
42.42	437.48	288.52	2.96	42.42	437.36	290.00	2.96
44.08	454.04	308.34	2.96	44.08	452.50	310.46	2.97
45.75	470.25	327.85	2.96	45.75	469.23	330.15	2.97
47.42	487.94	348.66	2.96	47.42	485.47	351.12	2.98
49.08	505.53	368.08	2.96	49.08	502.65	371.56	2.98
50.75	523.01	387.59	2.96	50.75	519.83	391.62	2.97
52.42	541.13	408.08	2.96	52.42	536.74	411.56	2.98
54.08	558.99	428.40	2.97	54.08	556.14	432.11	2.98
55.75	576.58	449.28	2.96	55.75	573.81	453.00	2.98
57.42	594.27	468.99	2.96	57.42	593.98	473.03	2.98
59.08	612.57	489.73	2.97	59.08	613.65	493.51	2.98
60.75	631.12	510.00	2.96	60.75	633.26	513.43	2.98
62.42	650.14	528.80	2.96	62.42	651.18	532.92	2.98
64.08	668.09	546.82	2.96	64.08	668.53	550.92	2.98
65.75	686.56	562.98	2.96	65.75	685.87	567.62	2.96
67.42	708.05	578.41	2.95	67.42	702.65	583.25	2.95
69.08	726.25	594.90	2.93	69.08	719.67	599.43	2.93
70.75	744.37	611.72	2.91	70.75	739.27	615.95	2.93
72.42	760.79	629.90	2.85	72.42	765.58	633.78	2.90
74.08	776.42	648.05	2.75	74.08	783.95	651.77	2.84
75.75	793.48	666.47	2.57	75.75	801.10	670.69	2.66
77.42	810.01	684.69	2.37	77.42	818.25	689.58	2.12
79.08	826.92	703.12	2.12	79.08	833.06	709.52	1.47
80.75	843.79	720.56	1.79	80.75	849.82	728.15	0.84
82.42	859.77	737.83	1.28	82.42	865.41	745.91	0.48
84.08	874.73	753.19	0.84	84.08	880.25	764.36	0.24
85.75	888.25	765.64	0.54	85.75	893.96	782.14	0.11
87.42	900.87	778.11	0.28	87.42	906.93	799.06	0.05
89.08	911.26	795.50	0.09	89.08	918.07	815.09	0.01
90.75	922.99	813.43	0.00	90.75	930.57	831.28	-0.01

Soda-sand-dolo (normal size)
Heating rate 10 K/min

Soda-sand-lime (normal size)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
17.42	195.42	72.33	2.86	17.42	193.44	73.30	2.89
19.08	209.19	86.78	2.61	19.08	206.52	87.84	2.73
20.75	222.78	98.87	2.28	20.75	220.83	99.74	2.46
22.42	237.68	103.04	2.40	22.42	238.66	103.22	2.53
24.08	251.28	104.04	2.59	24.08	262.37	103.40	2.67
25.75	268.17	104.55	2.76	25.75	278.24	104.41	2.77
27.42	294.84	105.80	2.90	27.42	294.18	106.82	2.87
29.08	313.78	113.25	2.95	29.08	311.84	114.15	2.93
30.75	329.31	136.58	2.97	30.75	328.08	129.95	2.95
32.42	344.23	160.50	2.97	32.42	347.15	154.22	2.94
34.08	362.69	181.00	2.97	34.08	362.25	177.02	2.96
35.75	378.91	200.91	2.97	35.75	378.55	198.26	2.95
37.42	395.23	220.21	2.97	37.42	395.06	218.20	2.95
39.08	412.18	239.50	2.96	39.08	411.26	237.69	2.95
40.75	428.74	258.15	2.97	40.75	428.54	257.10	2.96
42.42	445.38	277.01	2.97	42.42	445.80	275.77	2.96
44.08	462.02	295.19	2.96	44.08	463.20	294.38	2.97
45.75	479.08	312.74	2.97	45.75	480.42	312.64	2.97
47.42	497.00	329.65	2.96	47.42	497.19	329.69	2.96
49.08	515.10	346.64	2.96	49.08	515.15	347.20	2.95
50.75	533.01	363.63	2.93	50.75	532.76	364.49	2.94
52.42	549.99	380.81	2.89	52.42	550.02	382.19	2.91
54.08	566.05	397.92	2.80	54.08	567.15	399.75	2.86
55.75	582.79	414.59	2.65	55.75	584.06	416.28	2.79
57.42	599.75	431.50	2.46	57.42	601.84	433.55	2.69
59.08	622.50	448.21	2.23	59.08	619.36	450.96	2.56
60.75	641.31	465.35	2.01	60.75	638.10	468.54	2.41
62.42	657.85	482.83	1.81	62.42	656.46	486.06	2.26
64.08	674.45	499.77	1.66	64.08	673.66	503.77	2.10
65.75	691.59	517.05	1.55	65.75	691.41	521.29	1.96
67.42	707.71	533.48	1.48	67.42	708.23	538.32	1.81
69.08	724.82	550.47	1.44	69.08	724.66	554.91	1.68
70.75	741.53	566.02	1.38	70.75	742.24	572.08	1.52
72.42	758.43	582.36	1.33	72.42	759.41	590.79	1.36
74.08	774.74	598.65	1.29	74.08	776.40	608.75	1.22
75.75	794.04	615.14	1.27	75.75	792.48	629.59	1.11
77.42	811.25	629.05	1.27	77.42	808.34	648.94	1.02
79.08	827.66	639.99	1.25	79.08	822.99	666.88	0.95
80.75	844.63	655.08	1.23	80.75	836.00	684.71	0.89
82.42	859.39	665.24	1.17	82.42	848.17	702.43	0.82
84.08	870.91	675.21	1.07	84.08	858.07	719.23	0.73
85.75	883.38	686.35	0.97	85.75	869.99	735.88	0.62
87.42	893.38	695.13	0.88	87.42	880.51	750.46	0.50
89.08	906.14	704.42	0.79	89.08	890.10	764.00	0.36
90.75	922.92	713.01	0.67	90.75	900.09	776.49	0.23
92.42	940.65	724.40	0.42	92.42	909.13	785.60	0.10
94.08	958.56	740.91	0.14	94.08	937.77	794.14	0.09
95.75	976.28	760.98	0.05	95.75	973.38	802.61	0.09
97.42	994.75	780.70	0.03	97.42	992.98	809.12	0.10
99.08	1013.39	799.27	0.02	99.08	1010.47	815.23	0.11

Soda-sand-lime ----> Low heating rate (10 K/min)

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Big size (>1mm)

Medium size (0.35-0.5mm)

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
24.08	272.95	112.97	2.89	24.08	297.28	102.12	2.84
25.75	289.43	126.40	2.96	25.75	307.79	104.12	2.91
27.42	312.31	144.38	2.97	27.42	317.04	106.90	2.95
29.08	328.49	163.52	2.97	29.08	329.34	114.48	2.97
30.75	344.19	181.18	2.97	30.75	340.77	128.47	2.98
32.42	361.71	198.81	2.98	32.42	371.28	147.62	2.98
34.08	379.97	216.53	2.97	34.08	400.29	166.60	3.01
35.75	397.28	233.87	2.95	35.75	417.88	184.64	3.02
37.42	415.35	252.06	2.96	37.42	432.12	202.55	3.01
39.08	434.32	269.86	2.96	39.08	449.55	220.98	3.01
40.75	450.89	287.68	2.96	40.75	462.22	239.69	3.01
42.42	468.15	305.22	2.95	42.42	484.95	258.95	3.01
44.08	485.90	323.60	2.94	44.08	501.71	277.19	3.01
45.75	503.45	340.35	2.92	45.75	518.62	296.03	3.00
47.42	520.39	357.60	2.90	47.42	532.11	314.69	3.00
49.08	537.25	375.37	2.85	49.08	550.44	333.60	3.00
50.75	553.97	393.08	2.77	50.75	568.67	352.32	2.99
52.42	570.86	410.07	2.65	52.42	586.35	370.66	2.97
54.08	589.30	427.12	2.50	54.08	614.64	389.29	2.94
55.75	608.38	444.70	2.33	55.75	630.90	408.38	2.88
57.42	624.91	462.25	2.15	57.42	643.12	428.19	2.79
59.08	642.70	479.80	1.98	59.08	658.18	447.90	2.66
60.75	660.69	498.02	1.82	60.75	671.99	467.33	2.52
62.42	679.39	515.90	1.68	62.42	689.12	487.19	2.37
64.08	697.69	533.59	1.54	64.08	706.03	506.84	2.23
65.75	714.65	551.41	1.42	65.75	720.50	528.14	2.08
67.42	732.73	569.17	1.29	67.42	735.11	548.08	1.94
69.08	749.68	587.87	1.16	69.08	751.58	565.94	1.80
70.75	766.61	606.25	1.04	70.75	768.57	585.11	1.64
72.42	781.29	625.31	0.93	72.42	784.24	604.73	1.49
74.08	794.19	643.99	0.87	74.08	799.15	624.14	1.35
75.75	807.62	661.71	0.83	75.75	814.67	644.06	1.24
77.42	825.40	679.06	0.80	77.42	830.91	661.84	1.16
79.08	841.22	695.73	0.77	79.08	848.03	680.41	1.09
80.75	855.63	712.19	0.72	80.75	864.31	697.69	1.00
82.42	867.37	728.19	0.64	82.42	882.02	715.37	0.88
84.08	883.00	743.73	0.52	84.08	898.73	733.15	0.75
85.75	897.83	757.62	0.37	85.75	915.99	748.12	0.60
87.42	912.44	771.07	0.20	87.42	933.27	761.62	0.43
89.08	925.39	782.87	0.10	89.08	950.47	772.16	0.17
90.75	937.33	792.28	0.08	90.75	967.74	780.03	0.19
92.42	948.11	800.90	0.06	92.42	984.52	783.47	0.24
94.08	958.14	808.13	0.05	94.08	1000.45	791.13	0.24
95.75	968.28	814.37	0.04	95.75	1017.03	802.48	0.20
97.42	971.67	819.96	0.03	97.42	1034.32	810.08	0.17
99.08	970.95	824.29	0.03	99.08	1051.79	818.17	0.17
100.75	971.70	828.47	0.03	100.75	1067.57	829.46	0.15
102.42	971.33	832.13	0.05	102.42	1082.10	842.40	0.10
104.08	940.06	834.26	0.07	104.08	1096.07	856.38	0.05
105.75	887.92	835.18	0.06	105.75	1107.55	870.20	0.03

Soda-sand-lime (small size)
Low heating rateSoda-sand-dolo (big size)
Low heating rate

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
17.42	209.30	81.54	2.69	16.67	192.80	67.28	2.91
19.08	225.25	92.80	2.44	18.33	207.58	82.15	2.77
20.75	240.46	98.09	2.48	20.00	224.79	97.45	2.40
22.42	255.21	100.07	2.61	21.67	241.95	103.69	2.21
24.08	270.98	101.94	2.75	23.33	257.64	104.05	2.43
25.75	287.98	105.57	2.90	25.00	272.69	105.26	2.60
27.42	302.94	113.96	2.96	26.67	287.83	106.60	2.81
29.08	317.79	129.90	2.99	28.33	311.35	111.96	2.92
30.75	337.96	152.54	2.99	30.00	328.95	126.90	2.95
32.42	360.58	173.10	3.00	31.67	345.83	154.68	2.96
34.08	374.77	192.56	3.00	33.33	361.39	178.94	2.96
35.75	390.81	212.16	2.99	35.00	373.69	199.72	2.97
37.42	405.87	230.84	2.99	36.67	392.90	219.93	2.98
39.08	421.42	249.68	3.00	38.33	406.44	239.34	2.98
40.75	436.82	267.71	2.99	40.00	425.84	259.87	2.98
42.42	452.33	286.43	2.99	41.67	444.63	277.87	2.97
44.08	468.12	303.91	3.00	43.33	461.46	297.08	2.98
45.75	484.26	321.07	3.00	45.00	480.82	314.72	2.96
47.42	500.64	338.66	2.99	46.67	497.85	333.61	2.95
49.08	515.74	355.32	2.98	48.33	515.00	350.36	2.95
50.75	532.45	372.25	2.96	50.00	531.35	368.35	2.92
52.42	549.44	388.98	2.91	51.67	547.37	385.61	2.86
54.08	568.22	406.00	2.86	53.33	564.42	404.12	2.80
55.75	588.29	422.56	2.80	55.00	581.49	421.79	2.70
57.42	606.26	438.65	2.71	56.67	597.53	438.99	2.57
59.08	623.37	455.90	2.61	58.33	614.63	456.27	2.42
60.75	638.33	473.00	2.51	60.00	632.11	473.10	2.28
62.42	653.07	490.81	2.41	61.67	647.41	491.75	2.15
64.08	670.95	508.97	2.30	63.33	662.50	510.40	2.03
65.75	689.65	526.55	2.19	65.00	679.36	527.55	1.90
67.42	706.75	541.39	2.08	66.67	696.27	545.29	1.78
69.08	723.19	560.48	1.97	68.33	713.56	561.65	1.65
70.75	740.69	577.58	1.82	70.00	729.49	577.79	1.49
72.42	757.69	595.87	1.67	71.67	746.87	596.95	1.32
74.08	774.09	614.60	1.53	73.33	764.31	614.98	1.15
75.75	790.99	633.46	1.41	75.00	783.58	632.34	1.02
77.42	808.51	650.34	1.31	76.67	801.13	647.99	0.92
79.08	824.89	667.38	1.23	78.33	818.53	663.20	0.85
80.75	839.28	685.35	1.13	80.00	835.01	678.08	0.82
82.42	853.28	702.79	1.01	81.67	850.25	689.96	0.81
84.08	866.93	718.31	0.87	83.33	864.09	699.65	0.79
85.75	877.95	733.54	0.72	85.00	877.73	706.66	0.77
87.42	888.99	747.00	0.55	86.67	890.58	713.79	0.73
89.08	899.72	757.04	0.39	88.33	900.67	717.53	0.66
90.75	909.52	764.43	0.23	90.00	916.16	726.79	0.53
92.42	919.02	769.56	0.02	91.67	932.94	742.28	0.34
94.08	928.02	774.20	0.01	93.33	950.04	761.36	0.18
95.75	936.84	778.84	0.01	95.00	965.88	781.80	0.08
97.42	945.77	782.27	0.02	96.67	983.90	802.32	0.04
99.08	953.15	788.52	0.04	98.33	1001.76	816.73	0.02

Soda-sand-dolo (medium size)
Heating rate 10 K/min

Soda-sand-dolo (small size)
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
25.75	273.60	120.01	2.86	25.75	278.68	102.79	2.05
27.42	298.68	131.51	2.94	27.42	294.30	104.23	2.17
29.08	314.65	149.98	2.96	29.08	313.90	109.96	2.75
30.75	327.32	173.19	2.96	30.75	335.76	128.52	2.91
32.42	342.35	195.44	2.96	32.42	348.26	156.19	2.92
34.08	359.65	216.06	2.97	34.08	362.19	179.28	2.92
35.75	376.22	236.26	2.95	35.75	377.74	200.26	2.93
37.42	393.48	255.10	2.97	37.42	393.76	219.83	2.94
39.08	410.37	273.63	2.97	39.08	411.47	239.62	2.95
40.75	427.61	292.56	2.96	40.75	428.51	258.55	2.96
42.42	444.60	309.75	2.96	42.42	445.23	277.01	2.95
44.08	461.76	326.82	2.95	44.08	461.77	295.43	2.94
45.75	479.00	344.86	2.95	45.75	478.13	312.94	2.95
47.42	496.32	361.99	2.97	47.42	494.57	330.74	2.92
49.08	514.05	379.64	2.94	49.08	511.39	348.38	2.92
50.75	531.24	396.51	2.89	50.75	528.71	365.54	2.92
52.42	548.34	412.36	2.82	52.42	546.31	383.08	2.91
54.08	565.52	429.89	2.72	54.08	562.55	400.21	2.88
55.75	582.56	446.18	2.60	55.75	579.06	416.96	2.85
57.42	599.04	463.18	2.47	57.42	595.44	434.21	2.80
59.08	615.69	480.21	2.32	59.08	612.58	451.19	2.74
60.75	632.93	498.22	2.20	60.75	629.86	468.55	2.68
62.42	650.34	514.97	2.09	62.42	646.93	485.86	2.61
64.08	668.01	531.58	2.00	64.08	663.92	503.94	2.55
65.75	685.78	547.91	1.93	65.75	681.05	520.77	2.51
67.42	703.17	563.44	1.83	67.42	697.97	537.47	2.47
69.08	719.83	580.38	1.74	69.08	715.49	553.86	2.42
70.75	737.08	596.42	1.62	70.75	733.10	569.72	2.36
72.42	753.83	612.75	1.49	72.42	750.19	586.07	2.27
74.08	770.19	628.69	1.37	74.08	767.82	601.20	2.17
75.75	786.21	641.48	1.26	75.75	785.52	615.03	2.05
77.42	803.98	653.30	1.17	77.42	803.03	626.67	1.94
79.08	819.91	663.01	1.11	79.08	819.69	635.45	1.82
80.75	834.11	671.45	1.05	80.75	835.00	643.14	1.71
82.42	847.94	680.54	0.98	82.42	849.05	649.48	1.61
84.08	872.16	690.67	0.91	84.08	862.24	657.02	1.49
85.75	891.94	702.85	0.82	85.75	875.03	668.09	1.37
87.42	909.25	715.23	0.70	87.42	885.43	681.61	1.23
89.08	926.09	731.38	0.55	89.08	896.77	697.96	1.05
90.75	942.68	750.84	0.39	90.75	907.60	717.01	0.84
92.42	959.51	770.92	0.23	92.42	917.64	738.53	0.53
94.08	976.11	788.69	0.10	94.08	946.29	760.12	0.32
95.75	993.23	803.61	0.08	95.75	970.00	776.95	0.15
97.42	1010.25	814.91	0.07	97.42	988.10	790.55	0.10
99.08	1027.21	826.15	0.03	99.08	1006.02	802.29	0.10
100.75	1044.46	834.82	0.08	100.75	1022.87	812.24	0.10
102.42	1061.96	841.35	0.13	102.42	1040.68	820.31	0.13
104.08	1079.42	848.45	0.11	104.08	1058.19	826.51	0.19
105.75	1090.50	853.99	0.03	105.75	1067.94	831.45	0.13
107.42	1090.98	870.51	-0.02	107.42	1065.70	837.12	0.04

Soda-sand-lime (big size) ---> (>1mm)
 High heating rate ---> 80 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.00	1223.5	-	-	7.50	1194.6	791.4	0.03
0.17	1203.9	434.9	-	7.67	1189.5	796.5	0.03
0.33	1200.4	338.0	-	7.83	1194.5	800.1	0.02
0.50	1198.8	299.9	2.79	8.00	1195.0	805.7	0.02
0.67	1203.1	-	2.85	8.17	1196.8	808.5	0.02
0.83	1190.2	-	2.84	8.33	1196.4	812.2	0.02
1.00	1182.1	-	2.95	8.50	1196.2	820.0	0.02
1.17	1193.3	-	3.00	8.67	1195.2	827.4	0.02
1.33	1180.5	-	2.90	8.83	1201.7	826.6	0.02
1.50	1187.0	-	3.00	9.00	1196.5	835.1	0.02
1.67	1186.1	-	2.94	9.17	1200.0	837.5	0.01
1.83	1178.2	318.5	2.86	9.33	1199.8	841.0	0.01
2.00	1183.3	405.9	2.99	9.50	1199.2	848.7	0.01
2.17	1181.4	423.4	2.84	9.67	1203.2	851.2	0.01
2.33	1181.7	444.6	2.84	9.83	1198.8	857.2	0.01
2.50	1182.1	463.9	2.90	10.00	1201.9	861.7	0.01
2.67	1184.9	484.6	2.87	10.17	1206.1	866.1	0.01
2.83	1178.7	501.4	2.54	10.33	1203.9	872.7	0.01
3.00	1183.7	518.1	2.23	10.50	1201.7	876.9	0.01
3.17	1181.1	533.3	1.88	10.67	1205.7	878.3	0.01
3.33	1181.9	549.6	1.55	10.83	1205.9	875.9	0.01
3.50	1183.3	565.5	1.25	11.00	1206.6	880.0	0.02
3.67	1181.7	577.7	1.02	11.17	1208.7	883.4	0.02
3.83	1182.5	592.3	0.85	11.33	1204.9	891.2	0.02
4.00	1184.2	605.3	0.69	11.50	1205.3	898.1	0.02
4.17	1186.2	618.4	0.55	11.67	1208.0	908.3	0.01
4.33	1183.3	632.1	0.42	11.83	1209.5	912.5	0.01
4.50	1185.8	643.6	0.32	12.00	1210.5	917.5	0.01
4.67	1185.7	654.3	0.23	12.17	1206.3	929.6	0.01
4.83	1185.3	665.4	0.16	12.33	1213.6	927.5	0.01
5.00	1183.9	675.1	0.10	12.50	1208.0	942.8	0.01
5.17	1186.6	684.5	0.07	12.67	1210.5	942.7	0.01
5.33	1186.7	694.0	0.05	12.83	1213.3	948.8	0.01
5.50	1186.6	703.9	0.04	13.00	1212.3	956.7	0.01
5.67	1186.7	714.0	0.03	13.17	1214.1	960.4	0.01
5.83	1187.4	724.3	0.03	13.33	1215.2	968.7	0.01
6.00	1189.8	732.0	0.03	13.50	1215.4	978.9	0.01
6.17	1187.4	738.4	0.03	13.67	1214.0	983.1	0.01
6.33	1188.6	744.5	0.03	13.83	1213.0	992.9	0.01
6.50	1192.3	752.8	0.03	14.00	1213.0	998.0	0.01
6.67	1187.4	763.5	0.03	14.17	1215.7	1001.8	0.01
6.83	1193.4	766.2	0.03	14.33	1217.5	1005.0	0.01
7.00	1190.7	773.1	0.03	14.50	1217.2	1016.7	0.01
7.17	1190.3	779.8	0.03	14.67	1216.3	1018.6	0.01
7.33	1193.4	783.9	0.03	14.83	1218.8	1022.6	0.01

Soda-Sand-Lime (medium size) --> 0.35-0.5mm
 High heating rate ---> 80 K/min

Time (min)	atm-T (°C)	Batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	Batch-T (°C)	Ux (V)
0.00	1200.8	-	-	7.33	1173.8	618.0	0.86
0.17	1198.9	-	-	7.50	1173.3	630.6	0.76
0.33	1195.0	-	-	7.67	1174.1	639.9	0.67
0.50	1189.7	277.6	-	7.83	1173.4	641.1	0.59
0.67	1178.9	246.7	-	8.00	1177.1	655.0	0.50
0.83	1178.5	235.8	2.98	8.17	1178.2	670.8	0.40
1.00	1174.5	226.1	2.97	8.33	1178.6	676.3	0.29
1.17	1170.4	218.5	2.97	8.50	1177.4	674.2	0.21
1.33	1168.5	219.3	2.95	8.67	1175.9	674.0	0.15
1.50	1169.3	229.9	2.94	8.83	1180.1	694.9	0.11
1.67	1165.5	228.6	2.96	9.00	1178.5	695.0	0.09
1.83	1165.7	238.9	2.95	9.17	1180.7	706.5	0.08
2.00	1166.1	256.1	2.95	9.33	1182.2	710.4	0.06
2.17	1164.8	262.7	2.94	9.50	1179.8	711.2	0.05
2.33	1162.2	260.8	2.92	9.67	1182.9	721.0	0.05
2.50	1162.8	276.7	2.88	9.83	1177.4	708.3	0.04
2.67	1164.3	299.3	2.91	10.00	1181.8	725.6	0.04
2.83	1159.2	287.7	2.90	10.17	1190.6	753.9	0.03
3.00	1165.5	327.0	2.89	10.33	1183.1	736.4	0.03
3.17	1162.4	327.7	2.89	10.50	1176.5	718.1	0.02
3.33	1163.9	347.7	2.87	10.67	1181.5	738.5	0.02
3.50	1165.7	361.7	2.86	10.83	1182.7	737.3	0.01
3.67	1161.8	365.3	2.84	11.00	1187.3	753.1	0.01
3.83	1165.9	389.8	2.84	11.17	1182.5	738.1	0.00
4.00	1165.5	399.5	2.82	11.33	1186.2	751.5	0.00
4.17	1163.9	408.5	2.80	11.50	1186.2	756.8	-0.01
4.33	1166.5	427.2	2.74	11.67	1188.2	765.1	-0.02
4.50	1163.1	428.5	2.70	11.83	1190.2	775.2	-0.03
4.67	1165.6	451.0	2.64	12.00	1188.3	772.2	-0.04
4.83	1168.0	465.3	2.57	12.17	1189.5	778.5	-0.04
5.00	1166.0	470.4	2.48	12.33	1188.9	774.2	-0.05
5.17	1165.9	481.3	2.39	12.50	1190.3	784.6	-0.05
5.33	1167.2	495.8	2.27	12.67	1190.9	792.2	-0.05
5.50	1166.9	508.8	2.15	12.83	1193.4	807.8	-0.05
5.67	1171.4	533.0	2.02	13.00	1199.4	811.4	-0.05
5.83	1167.4	522.8	1.88	13.17	1183.5	775.4	-0.05
6.00	1168.2	535.8	1.76	13.33	1197.4	816.4	-0.05
6.17	1169.8	554.9	1.63	13.50	1195.7	812.1	-0.06
6.33	1169.3	558.7	1.50	13.67	1194.4	816.4	-0.06
6.50	1172.4	581.3	1.38	13.83	1195.7	-816.6	-0.06
6.67	1171.4	584.7	1.26	14.00	1193.4	815.1	-0.06
6.83	1171.4	594.6	1.16	14.17	1196.9	827.0	-0.06
7.00	1172.6	603.8	1.06	14.33	1197.2	829.7	-0.06
7.17	1173.8	619.7	0.96	14.50	1195.9	828.0	-0.06

Soda-sand-lime (small size) ---> 0.185-0.2mm
 High heating rate ---> 80 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.00	1187.8	-	2.39	7.50	1170.8	718.1	0.05
0.17	1186.1	-	2.40	7.67	1175.1	747.5	0.05
0.33	1186.3	-	2.94	7.83	1176.3	753.9	0.05
0.50	1179.9	278.1	3.00	8.00	1178.1	761.1	0.04
0.67	1180.1	261.2	2.99	8.17	1177.4	760.3	0.04
0.83	1170.1	230.5	2.98	8.33	1182.1	775.8	0.03
1.00	1170.5	239.4	2.96	8.50	1175.4	751.8	0.03
1.17	1168.5	242.1	2.96	8.67	1182.7	784.4	0.03
1.33	1165.7	247.1	2.95	8.83	1175.3	768.9	0.02
1.50	1166.0	269.8	2.92	9.00	1189.5	815.7	0.02
1.67	1162.7	275.0	2.90	9.17	1180.6	787.5	0.02
1.83	1164.0	300.0	2.87	9.33	1182.5	793.2	0.02
2.00	1163.5	312.4	2.85	9.50	1182.1	795.3	0.01
2.17	1155.4	299.2	2.83	9.67	1181.1	797.8	0.01
2.33	1163.6	349.4	2.82	9.83	1190.3	827.4	0.01
2.50	1158.7	356.0	2.81	10.00	1182.9	798.3	0.01
2.67	1172.1	419.9	2.78	10.17	1185.3	823.2	0.01
2.83	1154.0	361.4	2.75	10.33	1191.5	835.0	0.00
3.00	1164.3	425.0	2.69	10.50	1182.5	812.4	0.00
3.17	1162.4	438.6	2.63	10.67	1188.9	841.2	0.00
3.33	1161.1	448.0	2.53	10.83	1187.8	835.9	0.00
3.50	1160.3	462.0	2.38	11.00	1190.3	840.5	0.00
3.67	1162.0	488.8	2.25	11.17	1189.3	854.2	0.00
3.83	1163.1	504.8	2.11	11.33	1190.9	863.0	-0.01
4.00	1160.6	509.4	1.97	11.50	1191.3	868.2	-0.01
4.17	1163.2	527.7	1.80	11.67	1191.7	866.3	-0.01
4.33	1163.5	535.6	1.64	11.83	1193.4	875.0	-0.01
4.50	1161.6	546.8	1.47	12.00	1194.1	878.5	-0.01
4.67	1166.0	571.9	1.32	12.17	1193.5	881.9	-0.01
4.83	1163.3	582.9	1.18	12.33	1194.2	882.9	-0.01
5.00	1164.5	596.3	1.00	12.50	1192.5	879.6	-0.02
5.17	1166.1	610.9	0.82	12.67	1192.3	891.4	-0.02
5.33	1170.1	639.5	0.66	12.83	1202.0	925.0	-0.02
5.50	1167.8	631.2	0.51	13.00	1189.7	880.4	-0.02
5.67	1169.2	643.6	0.38	13.17	1200.0	914.8	-0.02
5.83	1170.0	671.6	0.28	13.33	1195.3	911.2	-0.02
6.00	1166.3	656.5	0.19	13.50	1199.8	927.9	-0.02
6.17	1169.6	678.9	0.13	13.67	1201.7	933.3	-0.02
6.33	1170.0	686.8	0.09	13.83	1199.4	929.6	-0.02
6.50	1172.2	699.8	0.07	14.00	1199.8	940.7	-0.02
6.67	1172.5	700.9	0.07	14.17	1203.2	955.5	-0.02
6.83	1175.8	722.5	0.07	14.33	1200.4	940.9	-0.02
7.00	1175.0	730.2	0.06	14.50	1203.6	959.7	-0.02
7.17	1171.6	712.6	0.06	14.67	1202.9	961.0	-0.02
7.33	1177.7	749.2	0.06	14.83	1200.2	949.1	-0.02

Soda-sand-dolo (Big size)---> (>1mm)
 High heating rate ---> 80 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
5.00	1178.3	607.7	2.78	12.50	1197.3	922.8	0.07
5.17	1180.1	655.4	2.82	12.67	1196.9	927.5	0.07
5.33	1179.8	667.6	2.90	12.83	1196.0	933.9	0.07
5.50	1181.5	677.8	2.88	13.00	1193.8	939.5	0.07
5.67	1180.1	687.2	2.82	13.17	1198.1	942.8	0.07
5.83	1184.5	699.6	2.83	13.33	1198.2	948.9	0.07
6.00	1184.3	710.2	2.83	13.50	1194.8	953.9	0.06
6.17	1184.9	718.1	2.78	13.67	1194.4	956.3	0.06
6.33	1184.7	729.7	2.82	13.83	1194.4	956.5	0.06
6.50	1186.9	739.8	2.80	14.00	1195.6	959.9	0.05
6.67	1189.3	745.2	2.70	14.17	1198.6	963.7	0.05
6.83	1188.3	753.7	2.58	14.33	1197.7	972.1	0.05
7.00	1188.2	759.9	2.39	14.50	1187.8	974.8	0.04
7.17	1190.9	767.0	2.21	14.67	1199.0	978.2	0.04
7.33	1187.3	775.1	2.03	14.83	1192.2	993.1	0.04
7.50	1188.2	780.3	1.86	15.00	1195.7	995.6	0.04
7.67	1191.4	785.9	1.70	15.17	1196.4	1002.5	0.04
7.83	1192.3	791.5	1.55	15.33	1203.5	1003.5	0.04
8.00	1194.2	798.5	1.43	15.50	1186.2	1012.4	0.05
8.17	1194.2	804.6	1.32	15.67	1203.7	1020.4	0.04
8.33	1196.0	808.5	1.23	15.83	1185.5	1022.2	0.04
8.50	1193.7	814.2	1.12	16.00	1204.9	1023.8	0.04
8.67	1200.0	816.6	1.02	16.17	1190.9	1031.5	0.04
8.83	1202.9	828.3	0.92	16.33	1195.6	1032.6	0.04
9.00	1194.9	828.8	0.83	16.50	1201.6	1044.8	0.04
9.17	1200.2	831.7	0.74	16.67	1192.5	1052.2	0.04
9.33	1204.4	842.8	0.67	16.83	1201.6	1055.6	0.03
9.50	1202.8	844.6	0.60	17.00	1195.7	1063.2	0.03
9.67	1198.0	845.9	0.52	17.17	1194.5	1066.3	0.03
9.83	1205.6	848.2	0.46	17.33	1206.4	1073.4	0.03
10.00	1205.2	855.3	0.40	17.50	1194.4	1073.1	0.03
10.17	1199.8	859.3	0.35	17.67	1194.1	1081.1	0.03
10.33	1199.2	863.0	0.31	17.83	1200.6	1083.3	0.03
10.50	1206.8	868.2	0.26	18.00	1198.9	1086.6	0.02
10.67	1203.3	875.8	0.21	18.17	1195.7	1084.8	0.02
10.83	1194.4	876.3	0.17	18.33	1194.4	1079.4	0.02
11.00	1204.8	881.4	0.14	18.50	1205.3	1089.2	0.02
11.17	1202.7	885.8	0.12	18.67	1205.5	1092.0	0.02
11.33	1203.1	890.8	0.10	18.83	1199.0	1098.6	0.02
11.50	1201.9	897.9	0.09	19.00	1205.2	1090.0	0.02
11.67	1200.1	898.7	0.08	19.17	1194.5	1098.7	0.02
11.83	1200.0	904.2	0.07	19.33	1201.6	1086.2	0.02
12.00	1200.5	908.7	0.07	19.50	1194.4	1088.1	0.02
12.17	1199.0	911.9	0.07	19.67	1200.1	1087.5	0.02
12.33	1198.0	916.4	0.07	19.83	1203.5	1084.7	0.02

Soda-sand-dolo (medium size) ---> (0.35-0.5mm)
 High heating rate ---> 80 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.00	1199.84	-	2.77	7.50	1156.08	845.81	0.03
0.17	1196.89	355.01	2.90	7.67	1163.08	840.76	0.03
0.33	1183.40	348.85	2.85	7.83	1160.30	848.93	0.03
0.50	1183.94	366.38	2.96	8.00	1163.08	851.81	0.03
0.67	1175.54	393.71	3.00	8.17	1166.39	851.93	0.03
0.83	1168.11	420.41	2.87	8.33	1162.95	864.94	0.04
1.00	1166.92	439.91	2.96	8.50	1158.85	875.20	0.03
1.17	1162.68	464.00	2.90	8.67	1163.75	872.90	0.03
1.33	1161.62	483.69	2.89	8.83	1168.78	871.69	0.02
1.50	1156.74	502.34	2.86	9.00	1168.11	882.22	0.52
1.67	1155.95	520.99	2.82	9.17	1166.00	890.34	0.82
1.83	1157.66	533.43	2.91	9.33	1163.21	897.63	0.64
2.00	1155.28	552.55	2.83	9.50	1167.58	898.72	0.50
2.17	1152.38	565.00	2.48	9.67	1168.38	903.71	0.39
2.33	1157.66	578.14	1.84	9.83	1167.85	909.57	0.29
2.50	1152.51	595.92	1.49	10.00	1169.05	912.38	0.21
2.67	1150.54	613.36	1.10	10.17	1168.11	919.21	0.14
2.83	1153.97	621.23	0.89	10.33	1170.10	920.56	0.08
3.00	1151.46	635.93	0.73	10.50	1169.17	926.19	0.03
3.17	1151.73	646.60	0.58	10.67	1170.24	930.73	0.00
3.33	1151.86	657.27	0.46	10.83	1170.76	935.27	-0.02
3.50	1149.49	674.24	0.36	11.00	1171.03	940.06	-0.02
3.67	1150.28	681.58	0.27	11.17	1169.31	948.94	-0.03
3.83	1152.13	688.80	0.19	11.33	1173.29	946.47	-0.03
4.00	1151.33	699.18	0.13	11.50	1174.62	945.48	-0.03
4.17	1152.52	705.25	0.08	11.67	1176.08	948.44	-0.03
4.33	1149.35	719.52	0.05	11.83	1173.95	958.07	-0.03
4.50	1157.26	718.71	0.03	12.00	1172.62	964.76	-0.03
4.67	1149.49	735.35	0.03	12.17	1174.22	966.62	-0.03
4.83	1155.15	738.05	0.03	12.33	1173.15	969.97	-0.02
5.00	1152.26	750.16	0.03	12.50	1175.14	971.34	-0.01
5.17	1152.91	758.18	0.03	12.67	1178.60	973.19	0.48
5.33	1154.23	761.24	0.03	12.83	1175.15	983.14	0.36
5.50	1155.42	768.32	0.03	13.00	1175.02	989.01	0.26
5.67	1155.02	776.36	0.02	13.17	1174.48	993.62	0.18
5.83	1154.89	783.34	0.02	13.33	1175.28	998.76	0.11
6.00	1156.87	787.25	0.02	13.50	1177.95	997.88	0.05
6.17	1159.38	789.15	0.02	13.67	1178.07	1002.14	0.01
6.33	1156.47	802.92	0.02	13.83	1181.13	1003.77	-0.01
6.50	1157.53	806.48	0.02	14.00	1179.93	1013.56	-0.03
6.67	1159.38	809.11	0.02	14.17	1182.46	1014.06	-0.03
6.83	1158.59	819.00	0.02	14.33	1179.13	1024.27	-0.03
7.00	1155.81	828.43	0.02	14.50	1179.00	1027.93	-0.03
7.17	1160.31	829.75	0.02	14.67	1182.06	1029.95	-0.03
7.33	1164.40	826.28	0.03	14.83	1186.86	1028.69	-0.03



Soda-sand-dolo (small size) ----> (0.185-0.2mm)
 High heating rate ----> 80 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.00	1225.0	-	2.10	7.50	1187.5	836.0	-0.02
0.17	1212.5	-	2.18	7.67	1195.2	819.5	-0.02
0.33	1199.2	288.1	2.80	7.83	1198.1	809.5	-0.01
0.50	1191.9	287.1	3.00	8.00	1199.6	814.5	-0.01
0.67	1188.7	300.4	2.91	8.17	1195.4	828.0	0.00
0.83	1192.3	299.3	2.05	8.33	1190.5	849.2	0.00
1.00	1187.3	329.1	1.26	8.50	1187.9	871.2	0.01
1.17	1183.9	360.2	0.96	8.67	1197.3	852.4	0.01
1.33	1184.5	377.0	0.76	8.83	1194.2	855.3	0.02
1.50	1186.5	394.6	0.61	9.00	1188.9	887.2	0.02
1.67	1186.2	414.4	0.54	9.17	1197.6	859.3	0.03
1.83	1181.9	443.8	0.51	9.33	1187.9	894.0	0.03
2.00	1180.2	467.7	0.47	9.50	1195.6	882.6	0.04
2.17	1178.3	493.9	0.44	9.67	1191.1	892.0	0.04
2.33	1175.7	532.7	0.41	9.83	1187.3	921.4	0.05
2.50	1183.1	527.3	0.37	10.00	1191.8	919.8	0.05
2.67	1179.0	546.8	0.31	10.17	1198.1	905.2	0.05
2.83	1184.3	555.2	0.24	10.33	1199.8	904.1	0.05
3.00	1178.9	577.4	0.17	10.50	1198.5	910.3	0.06
3.17	1185.8	576.6	0.11	10.67	1188.2	955.4	0.06
3.33	1178.2	611.6	0.06	10.83	1195.4	951.0	0.06
3.50	1185.4	603.0	0.03	11.00	1198.0	940.9	0.06
3.67	1183.1	633.2	0.01	11.17	1189.7	987.5	0.06
3.83	1182.2	638.7	-0.01	11.33	1197.6	970.8	0.06
4.00	1186.5	643.3	-0.01	11.50	1192.9	1011.6	0.05
4.17	1183.5	666.0	-0.02	11.67	1197.0	997.0	0.05
4.33	1187.7	658.4	-0.03	11.83	1191.7	1043.5	0.05
4.50	1184.2	681.2	-0.03	12.00	1200.4	1021.1	0.05
4.67	1185.8	684.7	-0.03	12.17	1192.1	1061.2	0.04
4.83	1183.3	704.9	-0.03	12.33	1192.7	1086.1	0.04
5.00	1186.6	698.7	-0.03	12.50	1200.9	1065.4	0.04
5.17	1184.3	723.4	-0.03	12.67	1200.8	1073.0	0.03
5.33	1185.0	718.9	-0.03	12.83	1202.5	1069.5	0.03
5.50	1185.4	735.8	-0.03	13.00	1203.9	1065.8	0.03
5.67	1186.7	729.8	-0.04	13.17	1204.7	1070.8	0.03
5.83	1187.1	749.6	-0.04	13.33	1201.6	1083.8	0.02
6.00	1182.5	767.8	-0.04	13.50	1194.7	1107.2	0.02
6.17	1191.0	755.8	-0.04	13.67	1192.3	1135.2	0.02
6.33	1185.0	774.8	-0.04	13.83	1200.1	1112.3	0.02
6.50	1192.1	771.3	-0.03	14.00	1205.9	1092.0	0.02
6.67	1189.1	776.0	-0.03	14.17	1203.2	1094.7	0.02
6.83	1185.9	803.3	-0.03	14.33	1198.1	1109.9	0.02
7.00	1195.7	781.7	-0.03	14.50	1200.1	1103.6	0.02
7.17	1192.6	791.4	-0.03	14.67	1203.6	1093.3	0.02
7.33	1185.4	829.7	-0.02	14.83	1204.1	1114.9	0.02

74SiO₂,10CaO,16Na₂O R=+20
Heating rate 10 K/min

74S,10C,16N R=0
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
17.42	203.51	64.21	2.97	17.42	211.80	66.38	2.92
19.08	217.48	75.14	2.93	19.08	230.43	79.02	2.83
20.75	230.18	86.26	2.79	20.75	247.15	89.98	2.70
22.42	243.88	95.78	2.59	22.42	260.81	96.47	2.69
24.08	270.72	101.27	2.56	24.08	272.34	98.99	2.84
25.75	288.28	103.31	2.71	25.75	282.95	100.74	2.95
27.42	302.03	107.02	2.87	27.42	297.12	103.04	2.98
29.08	317.16	115.54	2.96	29.08	311.15	115.67	2.99
30.75	332.31	130.98	2.97	30.75	325.37	140.37	3.00
32.42	349.57	150.28	2.97	32.42	338.20	159.96	3.00
34.08	367.90	168.57	2.98	34.08	342.59	177.82	3.00
35.75	384.41	186.12	2.99	35.75	354.75	194.69	2.99
37.42	401.77	204.07	2.99	37.42	379.03	211.54	2.99
39.08	417.92	221.49	2.99	39.08	395.97	226.86	2.98
40.75	434.29	239.13	2.99	40.75	412.00	242.30	2.99
42.42	451.03	256.03	2.99	42.42	428.24	257.86	2.99
44.08	468.64	273.78	2.98	44.08	448.26	275.35	2.99
45.75	485.85	293.65	2.98	45.75	467.96	292.49	3.00
47.42	497.95	311.46	2.98	47.42	484.18	309.93	2.99
49.08	509.96	329.86	2.99	49.08	502.42	327.42	3.00
50.75	530.66	347.87	2.99	50.75	518.56	344.65	3.00
52.42	544.87	366.23	2.99	52.42	535.59	362.96	3.00
54.08	562.48	384.72	2.99	54.08	548.93	380.62	2.99
55.75	585.12	403.74	2.96	55.75	568.89	398.62	2.96
57.42	607.42	422.02	2.93	57.42	586.39	417.13	2.95
59.08	626.61	441.01	2.90	59.08	605.81	435.65	2.93
60.75	646.40	460.66	2.85	60.75	622.76	453.96	2.90
62.42	665.24	480.23	2.80	62.42	642.95	473.52	2.86
64.08	681.68	500.70	2.74	64.08	658.69	493.90	2.82
65.75	698.20	521.03	2.66	65.75	678.22	513.63	2.76
67.42	714.02	541.27	2.57	67.42	698.21	532.65	2.70
69.08	728.98	560.25	2.45	69.08	715.18	551.82	2.61
70.75	745.78	579.94	2.31	70.75	731.04	569.56	2.48
72.42	761.58	602.27	2.14	72.42	747.18	592.09	2.33
74.08	778.07	624.63	1.95	74.08	763.26	615.57	2.16
75.75	795.46	647.47	1.77	75.75	781.34	637.68	2.00
77.42	812.42	668.66	1.65	77.42	798.50	658.79	1.89
79.08	829.32	685.06	1.57	79.08	814.20	679.80	1.80
80.75	846.17	699.77	1.49	80.75	829.88	699.34	1.69
82.42	862.89	715.52	1.37	82.42	845.99	717.62	1.55
84.08	878.64	732.01	1.21	84.08	861.57	733.42	1.36
85.75	895.20	749.80	1.00	85.75	876.43	746.67	1.11
87.42	911.47	765.85	0.77	87.42	891.12	759.34	0.88
89.08	928.22	781.19	0.55	89.08	907.58	772.07	0.64
90.75	944.93	796.96	0.37	90.75	925.00	785.07	0.38
92.42	961.55	810.32	0.23	92.42	941.36	798.06	0.21
94.08	978.79	821.83	0.14	94.08	963.35	809.58	0.12
95.75	996.22	831.77	0.09	95.75	997.18	818.46	0.08
97.42	1011.64	838.80	0.04	97.42	1021.41	827.13	0.06
99.08	1025.64	843.12	-0.02	99.08	1034.10	835.11	0.03

74SiO₂, 10CaO, 16Na₂O R=-20

Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
0.75	35.71	26.84	2.97	57.42	618.98	446.33	2.86
2.42	57.94	26.73	2.97	59.08	633.94	466.32	2.81
4.08	82.01	27.21	2.98	60.75	651.65	485.67	2.78
5.75	103.41	28.29	2.97	62.42	669.40	504.85	2.72
7.42	119.61	30.06	2.95	64.08	686.40	524.41	2.64
9.08	126.41	34.10	2.95	65.75	702.80	542.41	2.55
10.75	140.30	38.35	2.97	67.42	717.26	560.60	2.41
12.42	159.46	43.14	2.98	69.08	733.98	578.25	2.24
14.08	176.90	49.68	2.98	70.75	751.43	597.43	2.04
15.75	193.86	57.63	2.97	72.42	766.59	617.71	1.86
17.42	210.77	68.70	2.94	74.08	783.32	639.00	1.71
19.08	225.75	81.11	2.79	75.75	799.91	657.20	1.59
20.75	240.87	92.22	2.44	77.42	817.51	676.14	1.49
22.42	256.27	99.56	2.21	79.08	834.05	695.59	1.37
24.08	274.36	102.74	2.48	80.75	850.63	714.92	1.23
25.75	295.57	107.39	2.82	82.42	867.75	735.53	1.02
27.42	310.39	116.68	2.94	84.08	883.82	754.17	0.80
29.08	323.28	131.02	2.97	85.75	900.16	771.49	0.61
30.75	340.49	149.96	2.97	87.42	916.25	786.36	0.45
32.42	359.75	169.39	2.98	89.08	932.82	798.27	0.29
34.08	376.35	186.92	2.97	90.75	949.96	810.89	0.18
35.75	392.53	205.48	2.97	92.42	966.91	819.99	0.10
37.42	408.44	223.34	2.97	94.08	984.10	826.81	0.06
39.08	426.14	241.54	2.97	95.75	1001.17	832.30	0.05
40.75	442.11	260.55	2.97	97.42	1018.59	837.86	-0.02
42.42	459.87	278.43	2.97	99.08	1034.60	845.28	0.00
44.08	478.23	296.54	2.97	100.75	1048.40	859.35	0.04
45.75	494.66	314.70	2.97	102.42	1062.56	878.65	0.19
47.42	509.84	332.76	2.96	104.08	1075.88	898.16	0.00
49.08	532.94	351.32	2.95	105.75	1088.61	919.39	0.00
50.75	552.78	370.91	2.95	107.42	1094.26	954.83	0.01
52.42	568.10	389.94	2.94	109.08	1094.19	995.51	0.01
54.08	585.87	408.98	2.92	110.75	1093.12	1037.46	0.02
55.75	603.39	427.07	2.89	112.42	1095.04	1057.44	0.01

จุฬาลงกรณ์มหาวิทยาลัย

74S,10C,16N+NaCl 1wt% R=+20
Heating rate 10 K/min

74S,10C,16N+NaCl 1wt% R=-20
Heating rate 10 K/min

Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)	Time (min)	atm-T (°C)	batch-T (°C)	Ux (V)
10.75	142.34	37.92	2.97	10.75	137.86	34.68	2.98
12.42	161.48	42.96	2.97	12.42	157.39	39.16	2.98
14.08	179.60	48.93	2.97	14.08	176.26	45.10	2.98
15.75	195.39	57.37	2.96	15.75	194.17	52.37	2.98
17.42	211.03	67.36	2.93	17.42	209.24	62.58	2.95
19.08	230.17	79.80	2.88	19.08	224.14	75.35	2.88
20.75	250.73	91.23	2.70	20.75	238.41	86.41	2.72
22.42	262.23	99.60	2.34	22.42	253.66	95.76	2.43
24.08	277.32	102.57	2.25	24.08	266.50	99.06	2.28
25.75	294.05	105.73	2.66	25.75	280.49	100.15	2.47
27.42	311.15	115.90	2.96	27.42	296.46	106.19	2.94
29.08	326.54	136.24	2.96	29.08	322.01	122.96	2.98
30.75	343.38	155.02	2.97	30.75	343.72	144.07	2.98
32.42	363.06	172.98	2.97	32.42	362.72	162.97	2.98
34.08	378.28	189.76	2.97	34.08	375.32	180.54	2.98
35.75	392.65	207.24	2.98	35.75	393.96	199.34	2.98
37.42	408.06	225.26	2.97	37.42	409.88	216.60	2.99
39.08	425.37	242.43	2.97	39.08	424.77	234.21	2.97
40.75	447.12	259.00	2.97	40.75	441.20	252.73	2.97
42.42	468.47	276.59	2.96	42.42	458.95	270.15	2.97
44.08	482.57	295.65	2.97	44.08	477.75	288.87	2.96
45.75	499.55	314.22	2.97	45.75	496.31	307.59	2.97
47.42	517.59	332.56	2.97	47.42	512.53	325.42	2.97
49.08	534.31	351.40	2.97	49.08	530.20	343.77	2.97
50.75	550.06	370.33	2.96	50.75	547.61	362.40	2.97
52.42	563.58	389.42	2.96	52.42	567.67	381.11	2.96
54.08	582.21	407.83	2.95	54.08	585.35	399.59	2.95
55.75	599.63	425.10	2.94	55.75	600.37	417.97	2.92
57.42	615.98	443.32	2.91	57.42	616.47	436.97	2.87
59.08	631.13	462.37	2.88	59.08	631.71	456.28	2.81
60.75	647.78	481.54	2.83	60.75	647.30	476.28	2.74
62.42	663.71	501.00	2.76	62.42	662.78	497.06	2.65
64.08	678.48	520.85	2.67	64.08	679.55	516.90	2.54
65.75	696.92	540.04	2.51	65.75	697.58	535.39	2.39
67.42	713.70	557.20	2.29	67.42	712.45	553.39	2.18
69.08	729.72	575.35	2.01	69.08	728.37	570.78	1.90
70.75	748.21	595.26	1.66	70.75	746.46	590.22	1.56
72.42	765.12	616.80	1.31	72.42	763.15	612.32	1.23
74.08	780.56	638.78	1.09	74.08	779.84	631.91	0.96
75.75	794.64	660.23	0.95	75.75	796.36	652.36	0.84
77.42	809.80	678.82	0.82	77.42	813.55	672.42	0.75
79.08	831.58	692.94	0.65	79.08	830.42	692.60	0.59
80.75	848.98	707.28	0.46	80.75	847.18	710.95	0.40
82.42	865.93	722.22	0.27	82.42	863.91	727.40	0.19
84.08	883.37	737.30	0.12	84.08	879.80	742.01	0.05
85.75	898.67	751.53	0.01	85.75	895.34	753.50	0.01
87.42	913.81	761.48	-0.02	87.42	911.91	761.38	-0.01
89.08	932.17	768.96	-0.02	89.08	929.53	765.45	-0.01
90.75	947.52	775.98	0.00	90.75	946.79	769.93	-0.01
92.42	962.17	783.29	0.01	92.42	964.12	775.41	-0.01

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